GOVERNMENT OF THE DISTRICT OF COLUMBIA
Department of the Environment

Office of the Deputy Director

November 29, 2010

Mr. Reginald Parrish
U.S. EPA Coordinator
District of Columbia Chesapeake Bay Watershed Implementation Plan
410 Severn Ave Suite 109
Annapolis, MD 21403

Dear Mr. ~~Parrish~~ Reggie

Pursuant to the EPA letter of November 9, 2009 to the Chesapeake Bay Program's Principals' Staff Committee in support of the development of the Chesapeake Bay TMDL and Clean Water Act Section 117(g)(1), please find enclosed for your review the Chesapeake Bay TMDL Watershed Implementation Plan (WIP) for the District of Columbia. The document is titled as:

"Chesapeake Bay TMDL Watershed Implementation Plan, District of Columbia Department of the Environment, November 29, 2010"

As shown in the WIP, the District expects to meet the interim and final target loads for Nitrogen, Phosphorous and Sediment. The District appreciates the coordination and support provided by EPA for the development of the WIP. If you have any clarifying questions, please contact Dr. Monir Chowdhury at (202) 535-2990.

Sincerely,

Hamid Karimi, PhD
Deputy Director
Natural Resources Administration

Enclosures

cc: Christophe A. G. Tulou, Acting Director, DDOE
Monir Chowdhury, DDOE
Robert Koroncai, Water Protection Division, EPA Region 3

Chesapeake Bay TMDL
Watershed Implementation Plan

District of Columbia

Department of the Environment

November 29, 2010

Acknowledgements

The District Department of the Environment (DDOE) would like to acknowledge and thank the following groups who assisted DDOE in preparing its Watershed Implementation Plan. We are thankful to: DC Water, USEPA Region III, EPA's Chesapeake Bay Program Office; EPA's contractor Tetra Tech for help in preparing the plan; and Metropolitan Washington Council of Governments for help in presenting the plan to stakeholders.

We would also like to thank our District and Federal stakeholders, such as dedicated staff in DDOE, DC Water, and our many sister agencies (such as DDOT, DPW, among others) whose cooperation is critical in carrying out the many implementation activities. We also acknowledge the participation and role of our Federal agency partners without whose cooperation going forward, we cannot fully implement the terms of this ambitious suite of stormwater and other water quality-related activities necessary to comply with the terms of the Bay-wide Total Maximum Daily Load. The District acknowledges that it can best accomplish the path of TMDL compliance by working in tandem with our many District and Federal partners and the development community. We look to each of these sectors to take ownership of the goals in this Implementation Plan and underlying the TMDL – the restoration of the Chesapeake Bay.

One complicating factor *at this time* is that the Federal Government has chosen to withhold payment of the District's Stormwater Fee (GAO letter of September 29, 2010: *Use of GAO's Appropriations to Pay the District of Columbia Stormwater Fee).* Unfortunately, the current DDOE Stormwater Management Plan, the 2007 Letter of Agreement and other related planning efforts are based on consideration of environmental factors, implementation costs, scheduling, and technical factors. A decrease in the fees collected will result in a reduction of funds available to us, and therefore would significantly impact and reduce the number and scope of management practices that the District could implement. We submit this Final Phase I WIP with this reality underlying our commitments. And, until this issue is fully resolved, EPA would do well to consider this predicament when issuing backstops in a situation where the jurisdiction lacks control or the requisite fiscal resources. While surely there are possible resolutions to this difficult situation, the District is limited in the interim until it is resolved. As previously stated, we remain guided by stringent regulatory, legislative, and policy approaches to managing stormwater.

Stakeholder Meetings Held

November 16, 2009 at MWCOG
August 19, 2010 (webinar)
August 25, 2010 at MWCOG
September 29, 2010 at National Zoo
Available on DDOE website at:
http://ddoe.dc.gov/ddoe/frames.asp?doc=/ddoe/lib/ddoe/information2/public.notices/District_Draft_WIP_Bay_TMDL_Sept_1_2010.pdf

District Contacts: Dr. Monir Chowdhury at Monir.chowdhury@dc.gov and Ms. Sarah Sand Sarah.sand@dc.gov.

Contents

1 Introduction 1
1.1 District of Columbia Setting 2
1.2 Chesapeake Bay Segmentation Scheme 2
2 Development of the WIP 4
3 Water Quality 5
3.1 District of Columbia Water Quality Criteria and Standards 5
3.2 Existing TMDLs in the District of Columbia 6
4 Nutrient and Sediment Sources 7
4.1 Point Sources 10
4.1.1 Blue Plains Wastewater Treatment Plant and Combined Sewer System (CSS) 10
4.1.2 Municipal Separate Storm Sewer System (MS4) 14
4.1.3 Nonsignificant Industrial Facilities 14
4.2 Nonpoint Sources 16
5 Interim and Final Nutrient and Sediment Loads 17
6 Nutrient Reduction Progress 1985-2009 20
6.1 Nutrient Load Reductions 20
7 Current Loading, Program Capacity and Projected Load Reductions 23
7.1 Wastewater and CSS System 23
7.1.1 Existing Loads 23
7.1.2 Current Programs and Capacity 24
7.1.3 Current Progress on Planned Implementation Activities and Implementation Schedule 34
7.1.4 Expected Load Reductions 34
7.1.5 Funding Capacity 36
7.2 MS4 37
7.2.1 Existing loads 38
7.2.2 Current Programs and Capacity 38
7.2.3 Current Progress on Planned Implementation Activities and Implementation Schedule 46
7.2.4 2009 to 2011 Chesapeake Bay Milestones 49
7.2.5 Anticipated BMP Implementation in the MS4 Area 2010-2025 53
7.2.6 Funding Capacity 56
7.3 Nonsignificant Industrial Point Sources 56
7.3.1 Washington Aqueduct 58
7.4 Nonpoint Sources 59
7.4.1 Existing Loads 59
7.4.2 Current Programs and Capacity (N, P, Sediment) 60
7.4.3 Anticipated BMP Implementation in the Others Area 2010-2025 62

7.5 Federal Facilities 65
7.5.1 Existing Loads 65
7.5.2 Current Programs and Capacity 65
8 Education and Outreach 75
9 Accounting for Growth 76
9.1 Development & Growth 76
9.2 Population Growth 77
9.3 Trading and Offsets 77
10 Gap Analysis 77
10.1 Point Sources 80
10.2 Regulated and Unregulated Nonpoint Sources 80
11 Commitment and Strategy to Fill Gaps 80
12 Contingencies 82
13 Tracking and Reporting Protocols 83
13.1 DC WASA Reporting Requirements 84
13.2 Assessing the Effectiveness of the SWMP and Loading in the MS4 area 84
14 References 88
Appendix A 91

Tables

Table 1. DC designated uses 5
Table 2. Numeric criteria for the District of Columbia 5
Table 3. Current Loads and Interim and Final Target Loads by Impaired Segment-shed. 18
Table 4. Nutrient and Sediment Allocations in the District of Columbia. 19
Table 5. Summary of TSS Allocations for Blue Plains 19
Table 6. Comparison of Nutrient Loads in 1985 and 2009. 20
Table 7. Summary of the Existing Loads from DC WASA Facilities 23
Table 8. Summary of Blue Plains and Long Term Control Plan Schedule of Upgrades and Water Quality Improvements 31
Table 9. Summary of the loads expected to result from upgrades to the Blue Plains Outfalls 001, 002 and the CSS 35
Table 10. Current Loads from the MS4 38
Table 11. FY 2009 DPW Street Sweeping Study Tentative Area/Street Classifications and Sweeping Frequencies (DDOE 2010c) 45
Table 12. Progress on the 2007 Letter of Agreement Implementation Milestones 46
Table 13. LID Project undertaken as part of the 2007 Letter of Agreement. 49
Table 14. Existing and Future BMP Implementation Activities in the MS4 area 53
Table 15. Summary of expected annual load reduction from the MS4 area. 53
Table 16. Anticipated Loads from the MS4 as a result of implementation activities 54
Table 17. Nonsignificant Industrial NPDES Dischargers 57
Table 18. Aggregated Nonsignificant Industrial Dischargers Existing and Anticipated Future Annual Loads 57
Table 19. Existing and Anticipated Future Annual Delivered Loads 58
Table 20. Current Loads in the Other Areas 60

Table 21. Anticipated Loads as a result of implementation activities 62
Table 22. Federal Loads by Chesapeake Bay Segment in DC 65
Table 23. Federal Agency Points of Contact for EISA Compliance 66
Table 24. Summary of the stormwater BMPs installed at Federal facilities between 2005 and 2010. 71
Table 25. Summary of current and projected loads and gaps between projected loads and allocations. 78

Figures

Figure 1. Chesapeake Bay Segment Drainages in the District of Columbia. 3
Figure 2. Source Sector Contributions to Total Nitrogen in the Chesapeake Bay Watershed. 7
Figure 3. Source Sector Contributions to Total Phosphorus in the Chesapeake Bay Watershed 8
Figure 4. Source Sector Contributions to sediment in the Chesapeake Bay Watershed. 8
Figure 5. Source Sector Contributions to Total Nitrogen in the District of Columbia. 9
Figure 6. Source Sector Contributions to Total Phosphorus in the District of Columbia. 9
Figure 7. Source Sector Contributions to Sediment in the District of Columbia. 10
Figure 8. Drainage boundaries for the CSO, MS4 and direct drainage (Other). 13
Figure 9. Illustration of the recommended control program in the Long Term Control Plan. 26
Figure 10. Planned Upgrades at the Blue Plains facility and the CSS area 33
Figure 11. Blue Plains total nitrogen loading and allocation. 35
Figure 12. Blue Plains total phosphorus loading and allocation. 36
Figure 13. Blue Plains total suspended solids loading and allocation 36
Figure 14. MS4 Total Nitrogen Loads and Allocation 54
Figure 15. MS4 Total Phosphorus Reductions and Allocation 55
Figure 16. MS4 Total Suspended Solids Reductions and Allocation 55
Figure 17. Total Nitrogen Reductions and Allocation for Other Areas 63
Figure 18. Total Phosphorus Reductions and Allocation for Other Areas 64
Figure 19. Total Suspended Solids Reductions and Allocation for Other Areas 64
Figure 20. Location and Ownership of Federal Land in the District 67
Figure 21. Location of stormwater BMPs installed on Federal Lands. 74
Figure 22. Total Nitrogen Reductions and Comparison to Target Loads. 78
Figure 23. Total Phosphorus Reductions and Comparison to Target Loads. 79
Figure 24. Total Suspended Solids Reductions and Comparison to Target Loads. 79
Figure 25. Stormwater and Erosion and Sediment Control Plans Review and Approved. 85
Figure 26. Number of erosions and sediment control and stormwater management construction site inspections. 86
Figure 27. Total number of inspections at stormwater management facilities (BMPs) 87
Figure 28. Total number of construction site and stormwater management BMP maintenance enforcement actions. 87

1 Introduction

This document is the District of Columbia's Watershed Implementation Plan (WIP) to reduce pollution to its waters and the waters of the Chesapeake Bay. This plan was developed in response to EPA's issuance of the forthcoming Chesapeake Bay Nutrient and Sediment TMDL (USEPA 2010a). The District's WIP describes the primary sources of total nitrogen, total phosphorus, and sediment to the surface waters of the District; the load reductions necessary to comply with the TMDL and meet water quality standards, the actions that are currently being undertaken to address the excess nutrients and sediment, the planned, future activities that will eventually lead to achieving the newer loads established by the TMDL along with a schedule for implementation.

This District of Columbia WIP was developed pursuant to Section 117(g)(1) of the Clean Water Act and partly contributes to fulfilling some expectations outlined in *Executive Order 13508: Chesapeake Bay Protection and Restoration* to create an accountability framework for guiding water quality restoration efforts (USEPA 2009a). This WIP represents "a key element of this new era of ecosystem restoration, greater transparency and accountability, and improved performance" (USEPA 2009a).

The WIP outlines how the District will accomplish the load reductions necessary to achieve the TMDL allocations as assigned by EPA. As partners with EPA in implementing the TMDL, the states and the District are required to "identify and commit to implement specific pollutant reduction controls and actions" in two-year milestones (USEPA 2009a). The milestones are intended to provide greater "source sector and geographic load reduction specificity, more rigorous assurances that load reduction will be achieved, and more detailed and transparent reporting to the public than past Bay restoration efforts" (USEPA 2009a). The required reductions are phased, with 60 percent of the reduction needed (from 2009 baseline load) being achieved by 2017. The remaining 40 percent is expected to be reduced by 2025. The two-year milestones provide a road map for successfully achieving these reductions and benchmarks against which progress will be measured. It is expected that the two-year milestones will result in nutrient and sediment reductions which will correspond to the schedule of load reduction targets in this WIP. Both the WIP and the two-year milestones are complementary, different and get at load reductions in the timeframes set forth by EPA.

In its 2009 Guidance on WIP development, EPA outlines eight elements that should be included. These are (USEPA 2009a):

- Element 1: Interim and Final Nutrient and Sediment Target Loads
- Element 2: Current Loading Baseline and Program Capacity
- Element 3: Account for Growth
- Element 4: Gap Analysis
- Element 5: Commitment and Strategy to Fill Gaps
- Element 6: Tracking and Reporting Protocols
- Element 7: Contingencies for Slow or Incomplete Implementation
- Element 8: Appendix with Detailed Targets and Schedule (Contained in this report as Appendix A)

As each of the eight elements is addressed in this WIP, it will be identified, including a brief description of EPA's expectations for the relevant element.

This document serves as the final Phase I WIP. In the TMDL the basin nutrient and sediment target loads are divided among the sectors in each of the 92 Section 303(d) impaired Bay and tidal tributary segments, known as impaired segment-sheds. Following development of the Phase I WIP, Phase II WIPs will be developed, providing a finer scale breakdown of load allocations to smaller geographic areas or to individual facilities that may have been aggregated in the Phase I WIP. Additionally, Phase II will feature updated data from the revised Chesapeake Bay Watershed Model. These revisions will resolve some discrepancies in the current model and may provide slightly altered target load allocations. Phase II will also provide an opportunity for the District to

incorporate additional details on the actions expected to be implemented by 2017 (the 60% level). Phase II WIPS will be submitted in draft form to the EPA by June 1, 2011 and finalized by November 1, 2011.

1.1 District of Columbia Setting

The District of Columbia is a highly urbanized area, and it is this urban setting that determines the sources and magnitude of the nitrogen, phosphorus and sediment loads from the watersheds within the District. The District covers 69 square miles, which is less than one half of one percent of the overall Potomac River Basin (DC DOH 2004). Although the District is a small percentage of the overall land area, it contains about 11 percent of the Potomac River Basin's population (DC DOH 2004). The Potomac and Anacostia Rivers are the major waterbodies within the District. It bears noting that 18% of the Anacostia River watershed and only 0.5% of the Potomac River watershed, respectively, lie within the District. Rock Creek is a smaller drainage within the Potomac River drainage area. Eighty percent of the land in the District is developed and another 20 percent is parkland, open space or surface waters. Unlike all the other jurisdictions in the Chesapeake Bay watershed, the District does not have any agricultural land. This is significant because watershed-wide, agriculture is the single largest contributor to the nutrient and sediment loads in the Bay. In the District, point sources are overwhelmingly the largest contributor to the nutrient and sediment loads; although, upstream agricultural runoff affects the water quality of the District's surface waters.

1.2 Chesapeake Bay Segmentation Scheme

The waters of the District of Columbia drain to the Potomac River Basin within the Chesapeake Bay watershed. The Chesapeake Bay watershed drains to 92 drainage segments, which represent the 303(d) impaired tidal segments and the Bay itself. The 92 impaired segments each have their own contributing drainage area (an impaired segment-shed). Of the 92 impaired segment-sheds, portions of four are within the District of Columbia:

- Upper Potomac River, DC – This segment is referred to as POTTF_DC and represents the drainage from Rock Creek and a portion of the Potomac River within the District.
- Upper Potomac River, MD – This segment is referred to as POTTF_MD and represents the drainage from parts of the District into the Maryland portion of the Potomac River.
- Anacostia River, DC – This segment is referred to as ANATF_DC and represents the drainage from the Anacostia River within the District.
- Anacostia River, MD – This segment is referred to as ANATF_MD and represents the drainage from parts of the District into the Maryland portion of the Anacostia River subwatershed.

These Chesapeake Bay segment drainages are depicted in Figure 1.

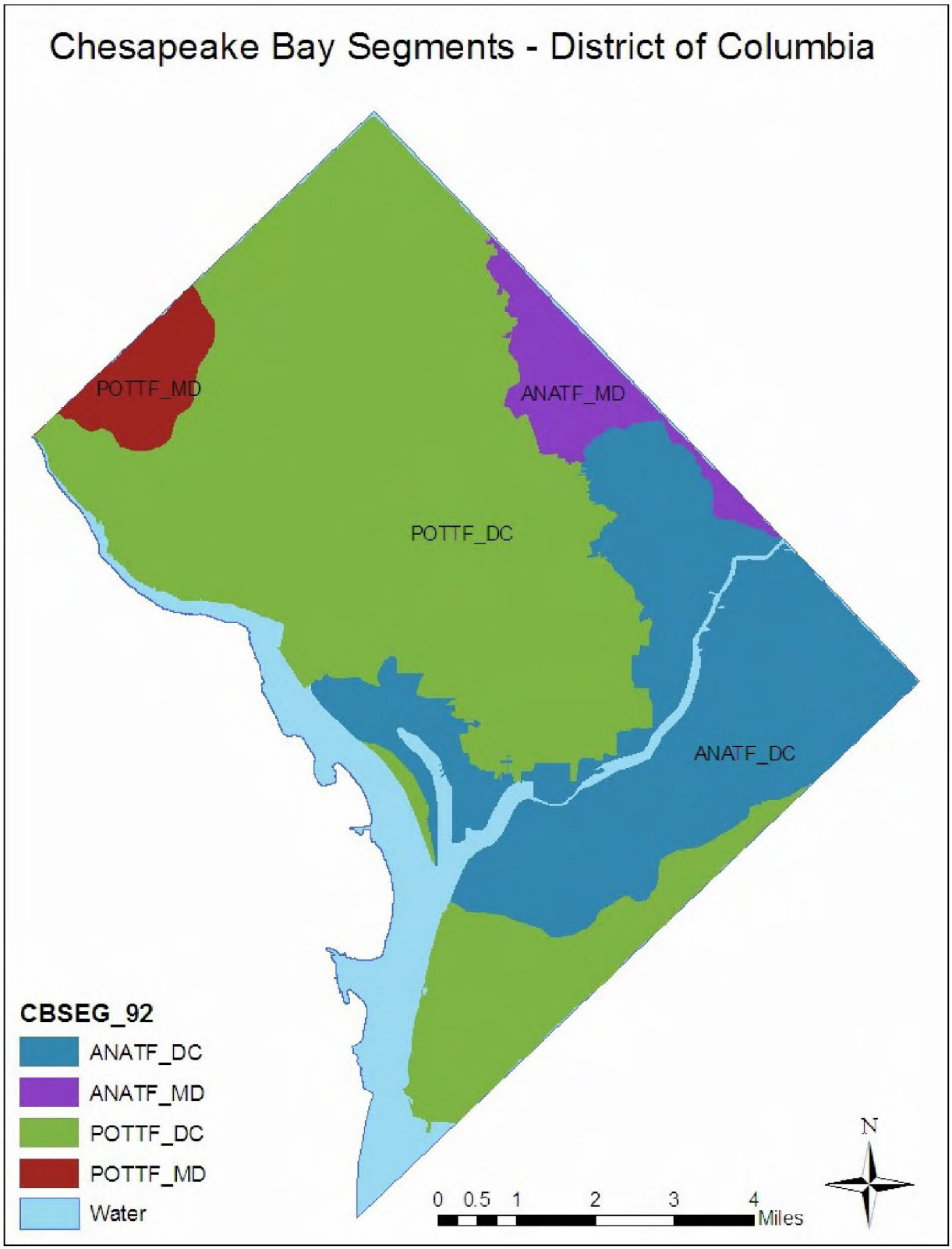

Figure 1. Chesapeake Bay Segment Drainages in the District of Columbia.

2 Development of the WIP

The District's 2004 Nutrient and Sediment Tributary Strategy outlined the collaborative partnerships in which the District Department of the Environment (previously part of the District Department of Health) participates. It is through these partnerships that watersheds are managed and water quality is improved. These are long-standing partnerships that are still relevant through the implementation of the Chesapeake Bay TMDL. The partnerships and how they are important to the improvement of the Anacostia River, Potomac River and the Chesapeake Bay, as described in the 2004Nutrient and Sediment Tributary Strategy, are outlined below (DCDOH 2004).

> "The District participates in numerous regional water quality protection efforts because it is part of several major watersheds that are the focus of regional organizations: the Chesapeake Bay watershed, the Potomac watershed, and the Anacostia watershed. In addition, the major point source of nutrients in the District's portion of the Potomac is Blue Plains Wastewater Treatment Facility, managed by the DC WASA and Sewer Authority (DC WATER, prior to mid-2010 it was known as DC WASA). DC WASA is a *regional* agency, serving the District, Maryland and Virginia. The District has worked closely with DC WASA over several years to address nutrient discharges, particularly nitrogen.
>
> The D.C. Watershed Protection Division…works with several regional organizations such as the USEPA Chesapeake Bay Program, the Interstate Commission on the Potomac River Basin (ICPRB) and the Metropolitan Washington Council of Governments (MWCOG) to address shared environmental concerns. Some of the issues addressed with these organizations include toxics management, nutrient reduction, habitat restoration, best management practices, and combined sewer overflow.
>
> *The Chesapeake Bay watershed*
>
> The Chesapeake Bay Program, with representatives from Maryland, Virginia, Pennsylvania, the Chesapeake Bay Commission, the USEPA and the District of Columbia, coordinates and supports activities related to the Bay and its tributaries. The District's association with the Chesapeake Bay Program has resulted in coordination and development of the *Special Tributary Strategy for Federal Lands* in the District of Columbia, the *Anacostia River Toxics Management Action Plan*, the *Tributary Nutrient Reduction Strategy* and the *Biennial Workplan for the Anacostia River Watershed*.
>
> *The Potomac River watershed*
>
> Research in conjunction with the ICPRB has advanced District and regional understanding of the toxics problems of the District's waterways. The ICPRB, with commissioners that represent West Virginia, Virginia, Pennsylvania, Maryland, the Federal Government and the District of Columbia Government, works to protect, enhance and conserve the Potomac River and its tributaries.
>
> *The Anacostia River watershed*
>
> The Anacostia Watershed Restoration Committee [now known as the Anacostia Watershed Restoration Partnership] comprises representatives from the USEPA, the State of Maryland, the counties of Prince Georges and Montgomery, US Army Corps of Engineers (ACoE) , MWCOG, ICPRB and the District of Columbia. The Committee, managed by MWCOG, works to restore

the Anacostia Watershed's water quality, wetlands, forest cover, ecological integrity, fish habitat and public participation. In addition to the committee, the effort to restore the watershed involves participation by about 60 organizations that include the US Fish and Wildlife Service, the US Department of Agriculture, US National Park Service, Washington Metropolitan Area Transit Authority, and Maryland-National Capital Parks and Planning Commission.

Federal Agencies

The federal government owns approximately [30] percent of the land area in the District of Columbia and is a key stakeholder in any effort to improve water quality. DDOE has held multiple meetings (in 2009 and 2010) with its key federal partners, including Department of Defense, General Services Administration, EPA, and the Navy. The District looks to its federal partners to fully engage with us as they implement the Energy Independence and Security Act (section 438) which has strong requirements for managing stormwater runoff from all federal facilities. DDOE is quite eager to continue exploring ways to creatively implement EISA on our partners whose footprint comprises fully one-third of the city's area.

3 Water Quality

3.1 District of Columbia Water Quality Criteria and Standards

The District of Columbia does not have numeric water quality standards for nutrients and sediment. Numeric criteria do exist for dissolved oxygen, secchi depth and chlorophyll – *a*. Reducing nutrients and sediment will allow water quality to improve such that the numeric criteria for these associated constituents will be met.

The text of the District of Columbia's Water Quality Standards can be found in the District of Columbia Municipal Regulations Title 21, Chapter 11.

The District of Columbia has defined the following designated uses, summarized in Table 1; and numeric criteria applicable to the Chesapeake Bay TMDL and this Watershed Implementation Plan are shown in Table 2.

Table 1. DC designated uses

Class of Water	Description
A	Primary contact recreation
B	Secondary contact recreation and aesthetic enjoyment
C	Protection and propagation of fish, shellfish and wildlife
D	Protection of human health related to consumption of fish and shellfish
E	Navigation

Table 2. Numeric criteria for the District of Columbia

Constituent	Criteria	Temporal Application	Designated Use
Dissolved Oxygen	7-day mean ≥ 6.0 mg/l Instantaneous Minimum ≥ 5.0 mg/l 30-day mean ≥ 5.5 mg/l 7-day mean ≥ 4.0 mg/l Instantaneous minimum ≥ 3.2 mg/l (At temperatures greater than 29°C, in tidally influenced waters, an instantaneous minimum dissolved oxygen concentration of 4.3 mg/L shall apply)	February 1 – May 31 June 1 – January 31	C

Constituent	Criteria	Temporal Application	Designated Use
Secchi Depth	0.8 m (seasonal segment average), tidal waters only	April 1 – October 31	C
Chlorophyll-*a*	25 µg/l (season segment average) Tidal waters only	July 1 – September 30	C

3.2 Existing TMDLs in the District of Columbia

Separate from the nutrient and sediment Bay-wide TMDL associated with this WIP, several TMDLs have already been prepared by the District for its surface waters. These include:

- TMDL for Fecal Coliform Bacteria in the Upper and Lower Anacostia River (2003)
- TMDL for Organics and Metals in the Anacostia River and Tributaries (2003)
- TMDL for Biochemical Oxygen Demand (BOD) in the Upper and Lower Anacostia River (2001)
- TMDL for Total Suspended Solids (TSS) in the Upper and Lower Anacostia River (2002)
- TMDL for Fecal Coliform Bacteria in Kingman Lake (2003)
- TMDL for Total Suspended Solids, Oil and Grease and Biochemical Oxygen Demand in Kingman Lake (2003)
- TMDL for Fecal Coliform Bacteria in Rock Creek (2004)
- TMDL for Organics and Metals in the Tributaries to Rock Creek (2004)
- TMDL for Fecal Coliform Bacteria in the Upper, Middle and Lower Potomac River and Tributaries (2004)
- TMDL for Organics, Metals and Bacteria in Oxon Run (2004)
- TMDL for Organics in the Tidal Basin and Washington Ship Channel (2004)
- TMDL for Nutrients/Biochemical Oxygen Demand for the Anacostia River Basin in Maryland and the District (2008)
- TMDL for Sediment/Total Suspended Solids for the Anacostia River Basin in Maryland and the District (2007)
- TMDL for PCBs for Tidal Portions of the Potomac and Anacostia Rivers in the District of Columbia, Maryland and Virginia (2007)
- TMDL for Trash for the Anacostia River Watershed, Montgomery and Prince George's Counties, Maryland and the District of Columbia (2010)

On a separate track, the Chesapeake Bay-wide TMDL (to be issued in December 2010) is designed to address two segments identified by the District of Columbia as impaired. The tidal Anacostia River (DCATF) is listed as impaired for TSS and BOD. The Upper Potomac River (DCPMS00E) is listed as impaired for pH. TMDLs have already been developed for the Anacostia River impairments, as listed above. The pH TMDL is required to be completed by the EPA based on the Kingman Park Civic Association v EPA consent decree (2000). Low pH impairment in the upper Potomac River is directly related to the Chesapeake Bay water quality improvement because low pH is a result of excess nutrients. The excess nutrients cause algal blooms, which lower the pH. Due to the link between excess nutrients and low pH, EPA sought and received a formal extension of the District of Columbia TMDL Consent Decree in order to complete the Upper Potomac River pH TMDL on the same schedule as the Chesapeake Bay TMDL. According to the EPA, "establishment of a Potomac River pH TMDL is directly linked to the establishment of the Chesapeake Bay TMDL because of their common impairing pollutants (nutrients) and hydrologic connection… [therefore] DC has asked EPA to establish the Potomac River pH TMDL" (USEPA 2009b).

4 Nutrient and Sediment Sources

Across the entire Chesapeake Bay watershed, nonpoint source agriculture is the largest source of nutrients and sediment to the Chesapeake Bay, with point sources contributing the second highest amount of nutrients and forests being the second highest contributor of sediment. Figure 2 through Figure 4 break down the contributions from each sector for total nitrogen, total phosphorus and sediment.

Within the heavily urbanized District of Columbia, there is no agricultural land use, and point sources contribute 94 percent of the nitrogen, 75 percent of the phosphorus and 62 percent of the sediment load (Chesapeake Bay Program Office Watershed Model Phase 5.3). The remaining load is almost entirely from nonpoint source pollution. Forestlands and atmospheric deposition on non-tidal waters (non-tidal water deposition) contribute a nearly negligible amount of nutrients and sediment to the overall load. Figure 5 through Figure 7 show a detailed breakdown of the general source sector contributions of nutrients and sediment in the District based on the Watershed Model Phase 5.3 2009 Progress Scenario (CBPO 2010).

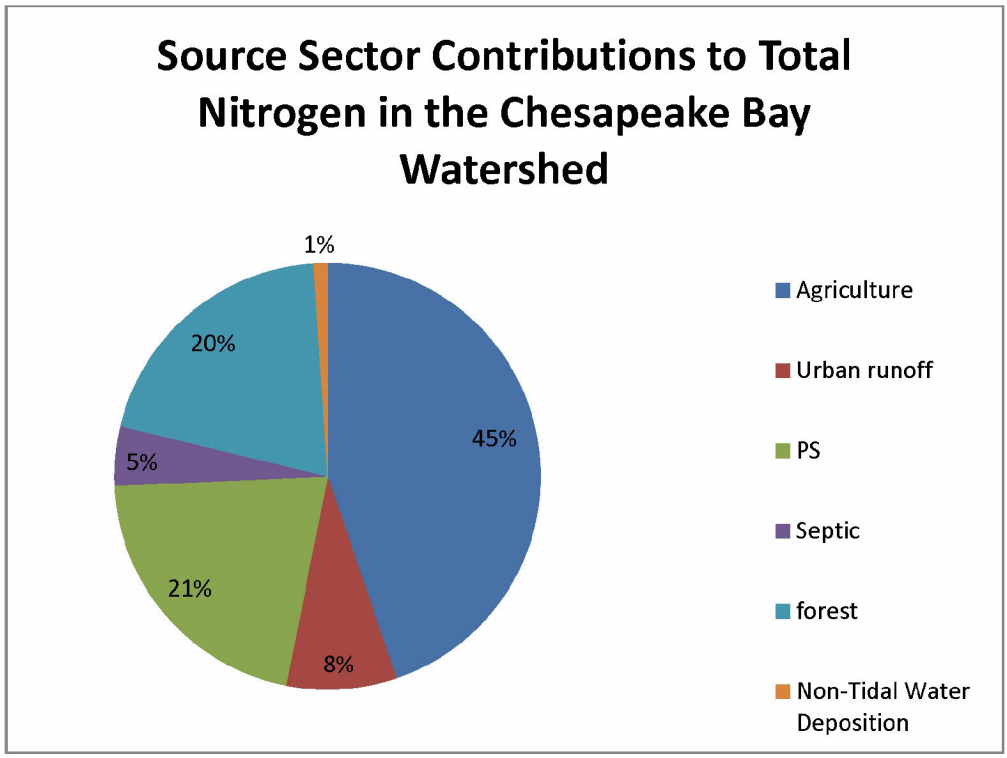

Figure 2. Source Sector Contributions to Total Nitrogen in the Chesapeake Bay Watershed.

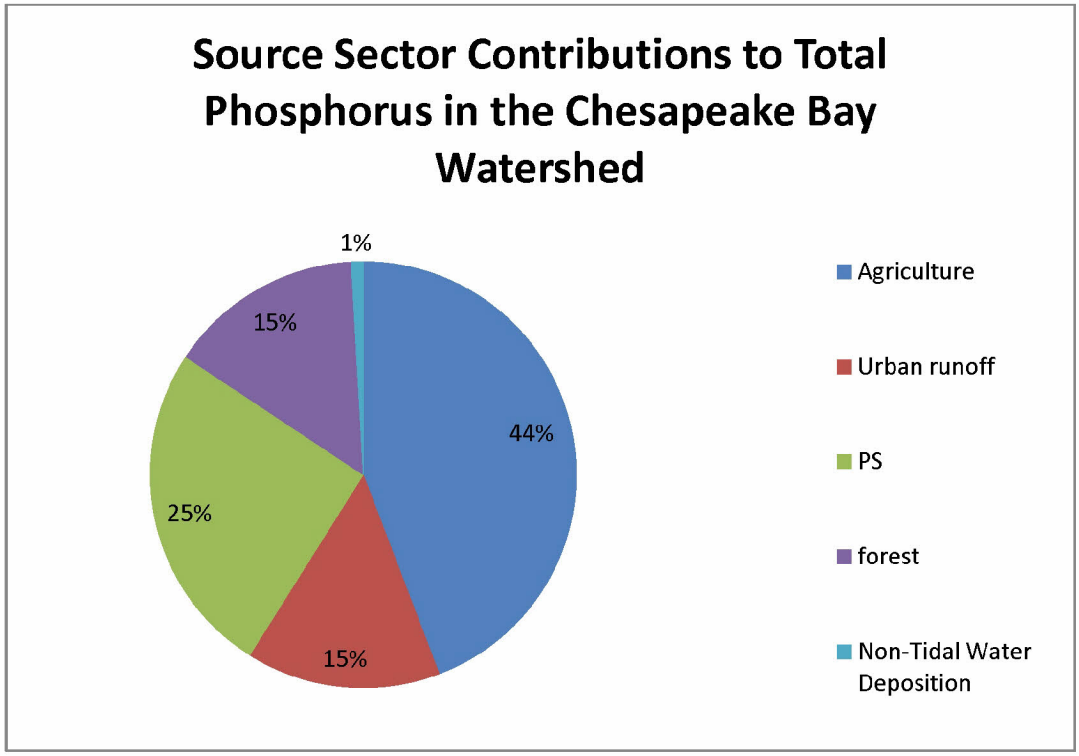

Figure 3. Source Sector Contributions to Total Phosphorus in the Chesapeake Bay Watershed.

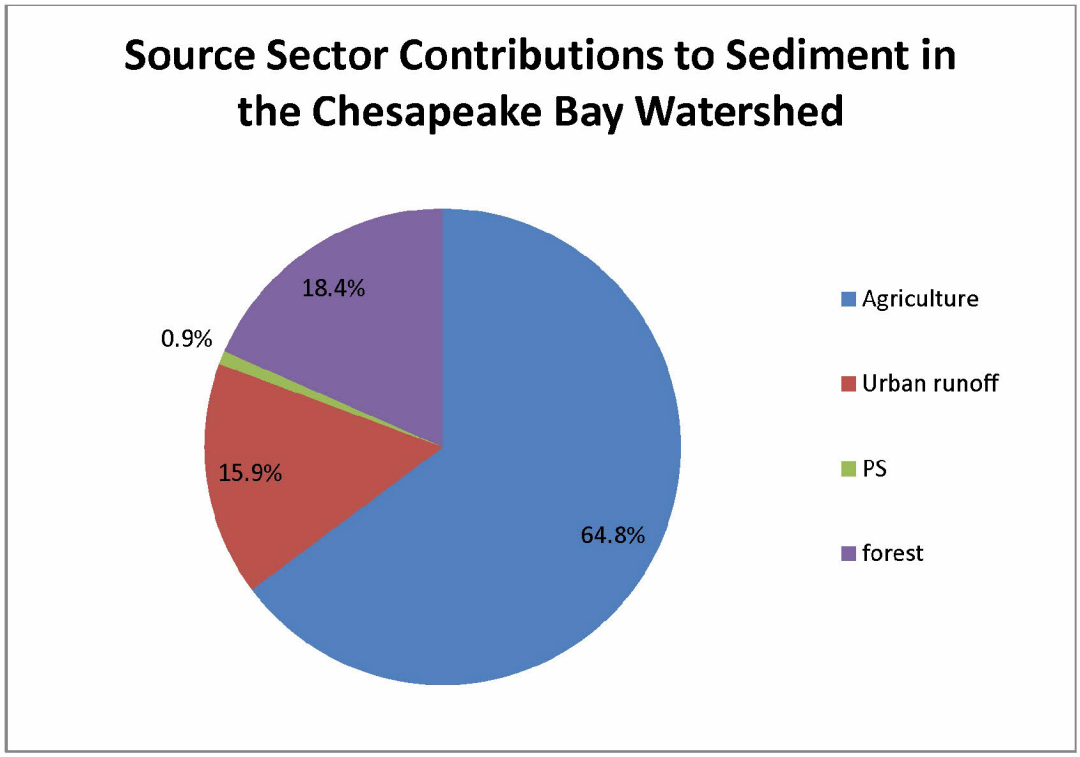

Figure 4. Source Sector Contributions to sediment in the Chesapeake Bay Watershed.

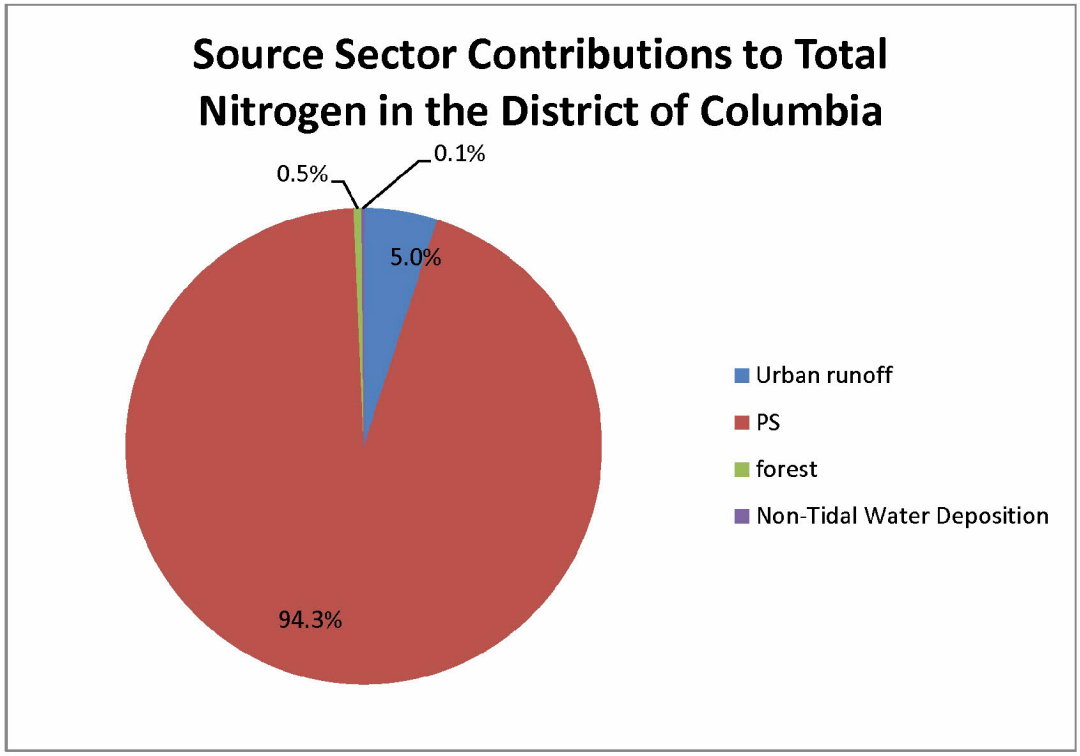

Figure 5. Source Sector Contributions to Total Nitrogen in the District of Columbia.

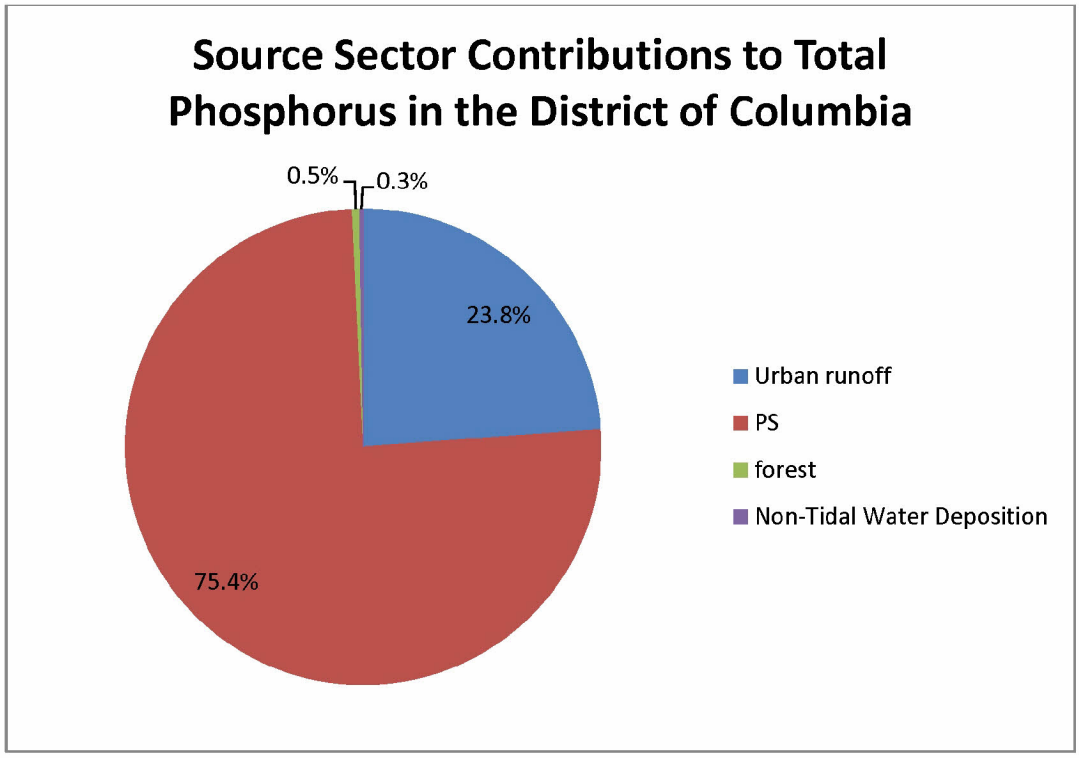

Figure 6. Source Sector Contributions to Total Phosphorus in the District of Columbia.

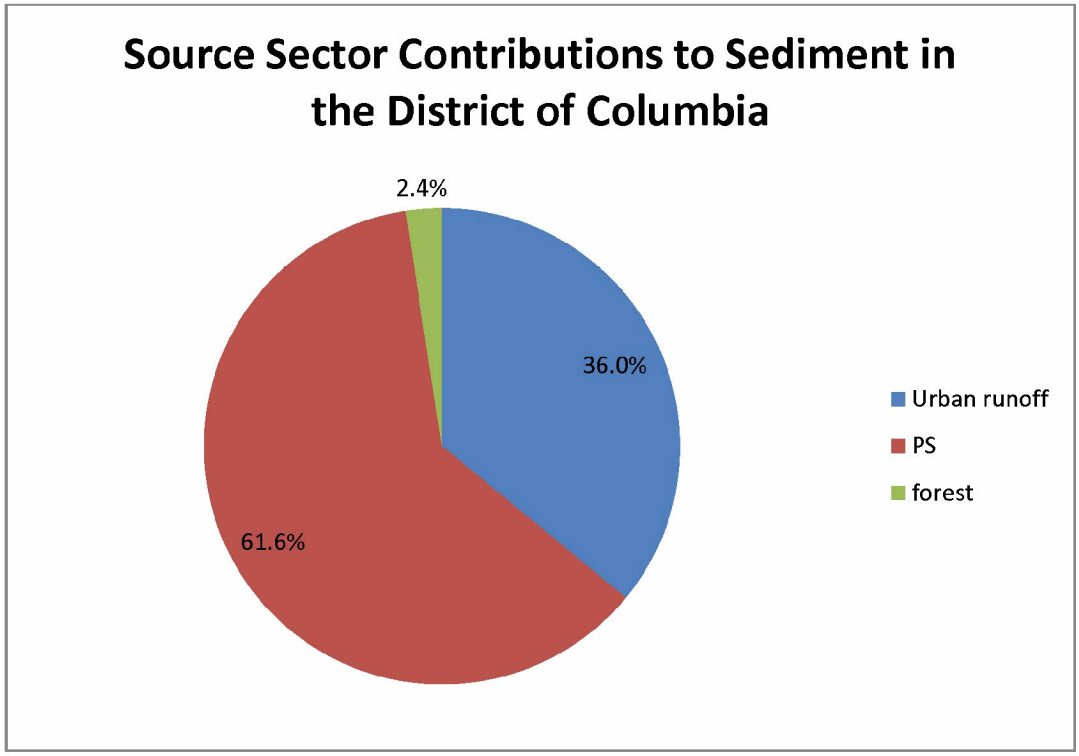

Figure 7. Source Sector Contributions to Sediment in the District of Columbia.

4.1 Point Sources

4.1.1 Blue Plains Wastewater Treatment Plant and Combined Sewer System (CSS)

The largest contributor to the nutrient loads in the District, and a significant contributor to sediment loads, is municipal wastewater and stormwater from the Blue Plains Advanced Wastewater Treatment facility. Blue Plains is a regional wastewater treatment facility serving portions of Montgomery and Prince George's counties in Maryland, Fairfax and Loudon counties in Virginia, all of the District of Columbia and Dulles International Airport (DC DOH 2004). All of the District's wastewater is transported to the Blue Plains Wastewater Treatment plant.

In addition to wastewater, Blue Plains also handles stormwater originating in the District of Columbia through its combined sewer system (CSS).

Some of the combined (sanitary) sewer and stormwater flow from the CSS flows to Blue Plains for primary treatment before being discharged to the Potomac River. During dry weather, all flows are routed to Blue Plains for treatment before being discharged to the Potomac River. During wet weather flows, if the treatment capacity at Blue Plains is exceeded, then excess flow - a mixture of stormwater and sanitary waste - is discharged directly to the Anacostia River, Rock Creek or the Potomac River (DC WASA 2010a). Roughly one-third of the District is served by the CSS. This system was constructed over 100 years ago (DC WASA 2010a). Figure 8 outlines the area served by the CSS. The CSS conveys both sanitary wastewater and stormwater. There are currently 53 combined sewer overflow (CSO) outfalls in the District (DC WASA 2010a). DC Water has in place plans for system improvements and CSO eliminations, which will allow the nutrient and sediment loads from CSOs to drop significantly (DC DOH 2004). These system upgrades are discussed in detail in Section 7.1. The primary pollutant concerns from CSOs are bacteria and biochemical oxygen demand (BOD) (DC DOH 2004).

The 2007 NPDES Permit Modification summarizes the Blue Plains facility, its treatment technologies and outfalls (EPA 2007), as stated below:

> "The Blue Plains Waste Water Treatment Plant consists of the following treatment technologies:
>
> Primary Treatment - a waste water treatment process that allows particles which float or settle to be separated from the water being treated. At Blue Plains, this process includes the following processes: raw wastewater pumping; grit removal; grease separation and primary sedimentation. Solids removed from the process are treated by digestion, elutriation and dewatering.
>
> Secondary Treatment - is a waste water treatment process used to convert dissolved or suspended materials into a form which can be separated from the water being treated. This process usually follows primary treatment by sedimentation. At Blue Plains, secondary treatment is accomplished by means of a modified-aeration step-feed activated sludge process. The secondary treatment facilities are comprised of aeration basins, secondary sedimentation basins, sludge return and wasting systems, the secondary blower facilities with associated blowers and diffusers and pumping stations. At Blue Plains carbon is reduced by use of coarse bubble diffused aeration and the plant uses chemical precipitation for phosphorus removal.
>
> Biological Nitrogen Removal (BNR) - a process whereby ammonia nitrogen is converted to nitrate nitrogen. The process also includes denitrification facilities for nitrogen removal, filtration for effluent polishing and chlorination for effluent disinfection. Blue Plains retrofitted existing facilities to enable full plant BNR operation in the spring of 2000.
>
> Nitrification - an aerobic process in which bacteria change the ammonia and organic nitrogen in waste water into oxidized nitrogen (usually nitrate). The second stage biological oxygen demand (BOD) is sometimes referred to as the "nitrification stage," first stage BOD is called the "carbonaceous stage." Blue Plains employs sparged air turbines for oxygenation.
>
> Denitrification - an anaerobic process that occurs when nitrite or nitrate ions are reduced to nitrogen gas and bubbles are formed as a result of this process. The bubbles attach to the biological flocs and float the flocs to the surface of the secondary clarifers. This condition is often the cause of rising sludge observed in secondary clarifiers or gravity thickeners. At Blue Plains, the denitrification facilities are able to treat the entire plant flow under limited conditions of process load and temperature.
>
> Filtration and Disinfection and Dechlorination - includes multimedia filtration of nitrified effluent and disinfection of the filtered effluent by chlorination and dechlorination prior to discharge.
>
> Solids Process - includes gravity thickening and anaerobic digestion of primary sludges, air flotation thickening of waste activated and chemical sludges, vacuum filtration of the thickened and digested sludges and direct off-site disposal of the vacuum filter cake…
>
> …Phosphorus Removal - Iron salts including ferric chloride, ferrous sulfate and liquid alum may be added to the unit process as follows: primary sedimentation, secondary treatment, nitrification and effluent filtration…
>
> "The Blue Plains Wastewater Treatment Plant is the largest advanced waste water treatment plant in the world. It covers 150 acres, has a design capacity of 370 million gallons per day (mgd), and a peak capacity of 1,076 million gallons per day. The collection system includes 1,800 miles of sanitary and combined sewers, 22 flow-metering stations, nine off-site wastewater pumping stations and 16 stormwater pumping stations within the District. Separate sanitary and storm sewers serve approximately two-thirds of the District. In older portions of the system, such as the downtown area, combined sanitary and storm sewer systems are prevalent…

> ….During wet weather, the plant flow capacity varies depending upon whether or not the peak flow [1036 mgd] occurs for greater than or less than four (4) hours. The plant has two discharge points, Outfalls 001 and 002.
>
> Outfall 002, which discharges to the Potomac River, is the principle discharge point. Treatment for this outfall includes primary treatment, secondary treatment, nitrification, biological nitrogen removal, filtration, disinfection and dechlorination. Outfall 001 functions as an excess flow conduit and is used to avoid hydraulic overloads to the plant during wet weather. Although flows vary, effluent from Outfall 001, which also discharges to the Potomac River, receives primary treatment, disinfection and dechlorination. Outfall 001 has been characterized as a CSO-related by-pass, pursuant to the 1994 Combined Sewer Overflow Policy ("CSO Policy").
>
> The treatment plant and sewer system discharge to the Potomac and Anacostia Rivers, Rock Creek and tributary waters. In its Water Quality Standards (WQS), the District of Columbia has designated these streams for primary contact recreation, aesthetic enjoyment, aquatic life, water oriented wildlife, raw water source for industrial water supply and for navigational use…"

In addition to Outfall 002, which treats only sanitary wastewater, and Outfall 001, which is considered a CSO-bypass with primary treatment and disinfection/dechlorination, there are 53 permitted CSO outfalls throughout the District, which discharge untreated water directly to the Anacostia and Potomac Rivers and Rock Creek.

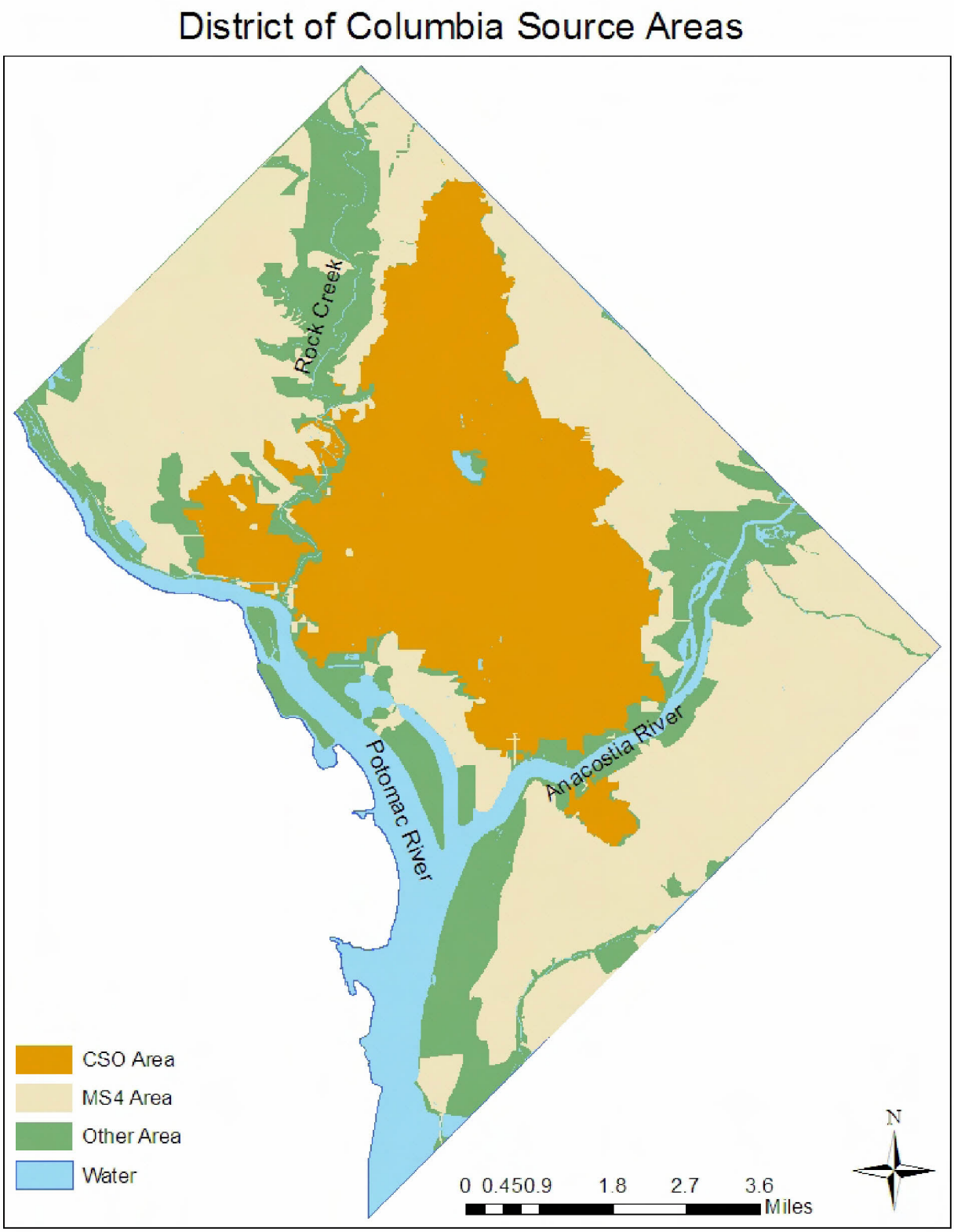

Figure 8. Drainage boundaries for the CSO, MS4 and direct drainage (Other).

4.1.2 Municipal Separate Storm Sewer System (MS4)

The District of Columbia has a NPDES MS4 permit issued by the US EPA to allow the discharge of stormwater from the MS4 area to the Potomac and Anacostia Rivers and associated tributaries. Roughly two-thirds of the District is served by the MS4; see Figure 8. Unlike the CSS, the MS4 is designed to convey only stormwater. Typically, the pollutant loads in the stormwater originate from nonpoint sources. Stormwater runoff moves over the land and collects land-based pollutants, including sediment and nutrients, and carries them to the storm drains (DC DOH 2004). At this point, these nonpoint sources of pollution become point sources because they have entered a discrete piped conveyance system. Nonpoint sources of pollution are discussed in further detail in Section 4.2

"The MS4 permit addresses the management of all stormwater that enters the storm sewer system for conveyance to receiving water bodies. In addition to managing the MS4 infrastructure with mapping, modeling and maintenance activities, the MS4 permit includes numerous activities designed to reduce the pollutants that are washed from the District's land area into storm drains during rain events" (DC DOH 2004).

4.1.3 Nonsignificant Industrial Facilities

There are 9 nonsignificant industrial dischargers in the District of Columbia. A detailed discussion of the nutrient and sediment loading from these facilities is discussed in Section 7.3. There are additional minor permitted stormwater discharging facilities within the District that have been aggregated with the MS4 and into the "Others" category, discussed in Section 4.2.

4.1.3.1 Washington Aqueduct

Historically, the Dalecarlia Water Treatment Plant, managed by the Washington Aqueduct, has been a significant source of sediments to the waters of the District (DC DOH 2004). The Washington Aqueduct is a division within the Army Corp of Engineers that manages the Dalecarlia Plant. The Dalecarlia Reservoir is a 46-acre earthen basin where roughly half the sediments settle out from the water as part of initial phase in the water treatment process (USEPA 2008). According to the current Washington Aqueduct NPDES permit, issued to the Army Corps of Engineers, once a residuals handling facility is complete, discharges from the sedimentation basins will no longer be permitted, except for occasional low-volume non-process waste discharges (USEPA 2008).

The 2008 NPDES Permit Reissuance Fact Sheet describes the facility (USEPA 2008):

> "The United States Corps of Engineers owns and operates the Dalecarlia and McMillan Water Treatment Plants which supply potable water to approximately one million residents in the District of Columbia, Arlington County, the City of Falls Church and portions of Fairfax County and Maryland. The plants provide water at cost to the Wholesale Customers, which is the District of Columbia, Arlington County and the City of Falls Church, Virginia. The Wholesale Customers approve the capital construction budget and are responsible for depositing sufficient funds with the Aqueduct to cover their proportional share of the total cost of running and funding improvements at the Aqueduct.
>
> An act of Congress created the Washington Aqueduct Division water supply system in the mid-1800's with the construction of the Great Falls Dam and intake, which is located in Maryland on the Potomac River. There is a second intake at Little Falls, also located in Maryland which the Corps uses intermittently. Water flows by gravity from the Great Falls intake to a forebay adjacent to the Dalecarlia Reservoir. From the forebay, a low-lift booster pump station pumps water into the Dalecarlia Reservoir. The Little Falls pumping station can also deliver water directly to the Dalecarlia Reservoir.

The Dalecarlia Reservoir is a 46-acre earthen basin which serves as a pretreatment reservoir for the two water treatment plants. Approximately 51% of the untreated sediments, which are naturally occurring solids in the raw water taken from the Potomac River, are separated from the aqueous portion of the untreated water in the Dalecarlia Reservoir. These untreated sediments are high quality soil that is periodically removed from the reservoir and land applied.

Water from the Dalecarlia Reservoir is delivered by gravity to both the Dalecarlia Water Treatment Plant (Dalecarlia sedimentation basins) and the Georgetown sedimentation basins, which is locally known as the Georgetown Reservoir. Water from the Georgetown sedimentation basins is delivered to the McMillan Water Treatment Plant.

Water from the Dalecarlia sedimentation basins is treated at the Dalecarlia Water Treatment Plant. Regardless of which plant processes the water, treatment is a three-step process which includes sedimentation, filtration and disinfection. The average production is 180 million gallons per day, however, during the summer the peak may approach 265 gallons per day.
Water delivered to the sedimentation basins at Dalecarlia and the Georgetown sedimentation basins contains solids that did not physically settle out at the Dalecarlia Reservoir. To make the water drinkable, these solids must be chemically treated. The Corps does this by adding aluminum sulfate (alum), a widely used drinking water flocculent.

The Dalecarlia facility uses 36 rapid dual media filters and the McMillan facility is equipped with 12 rapid dual media filters. Except for the filter backwash water at the McMillan Water Treatment Plant which is recycled to the McMillan Reservoir, and the filter backwash water at the Dalecarlia Water Treatment Plant, which is recycled to the Dalecarlia Reservoir, all sedimentation residuals are returned to the Potomac River."

There are primary permitted outfalls for the Dalecarlia Sedimentation Basins, which discharges process water and alum treated sediments and permitted leakage from the sedimentation basins and a spring located below the basins; and for the Georgetown Sedimentation Basins, which discharge process water and alum treated sediments. The outfalls for both Dalecarlia and Georgetown Sedimentation Basins discharge to the Potomac River (USEPA 2008). There are other permitted outfalls that discharge treated water and dechlorinated finished water to Rock Creek and Mill Creek (USEPA 2008).

4.1.3.2 General Services Administration – West Heating Plant

The West Heating Plant discharges ground water and steam condensate leakage that collect in a steam tunnel sump. The discharge goes to Rock Creek.

4.1.3.3 PEPCO Benning Generating Station

The Potomac Electric Power Company (PEPCO) maintains a NPDES permit for three discharge sources: cooling tower basin wash water, cooling tower blowdown and stormwater runoff, from the Benning Generation Station, which consists of two oil-fired steam turbine generator units. The process wastewater and stormwater are combined and discharged to the Anacostia River.

4.1.3.4 WMATA- Mississippi Ave. Drainage Pump Station (DPS)

The Washington Metropolitan Area Transit Authority (WMATA) maintains a NPDES permit to discharge treated ground water seepage from a 7,000 foot stretch of tunnels and vent shaft perimeter drains along WMATA's "F-route." Ground water is collected in a sump and treated for sediment removal and pH neutralization at the Mississippi Avenue Pumping Station, pumped north 475 feet to the Mississippi Avenue Fan Shaft, then pumped 50 feet to a District storm drain, which discharges to an outfall to Oxon Run, a tributary of the Potomac River.

4.1.3.5 Washington Navy Yard

The Naval District Washington holds a NPDES permit for discharges from the Washington Navy Yard, which is currently in administrative and supply use. The 80.2 acre facility is located on the banks of the Lower Anacostia River and stormwater from the site is collected in a subsurface stormwater drainage system the discharges directly to the river, the CSS and the MS4.

4.1.3.6 Super Concrete Corporation

The Super Concrete facility manufactures ready-mix concrete products. The majority of the treated effluent from process water and precipitation runoff is recycled and reused in the manufacturing process. When reuse is not possible, there are intermittent discharges of treated process water and stormwater runoff through a concrete-lined swale to an unnamed tributary to the Northwest Branch of the Anacostia River. This facility is transitioning to 100 percent recycling of process water.

4.1.3.7 World War II Memorial

The National Park Service holds a NPDES permit for the World War II Memorial, which covers 8.5 acres of the National Mall. An underdrain system beneath the Memorial provides for the permanent collection of groundwater generated from the site. Stormwater from the site is captured by a below grade drainage system. The filter backwash water and associated flushings of wash water contributes intermittently to the below grade system. The influent stormwater is treated in a three chamber sedimentation basin. Other sources of waste water are also treated. After treatment, the comingled effluent of groundwater, storm water, and fountain water (filter backwash and flushings of wash water) is collected and discharged to the waters of the Tidal Basin.

4.1.3.8 Walter Reed Army Medical Center

The United States Department of the Army has an NPDES permit to discharge industrial process water and stormwater from the Walter Reed Army Medical Center to the District MS4 and, thence, to Rock Creek. The process water is derived from Building 2's cooling and heating system, which includes air dryers, air compressors, and a steam line.

4.1.3.9 Mirant Potomac River Generating Station

The Mirant Potomac River Generating Station is located in Virginia but discharges to the District portion of the Potomac River. The facility maintains a NPDES permit for cooling water and low volume industrial discharges. Stormwater discharges are regulated under a separate general permit.

4.2 Nonpoint Sources

Nonpoint source nutrients and sediment are delivered to the Potomac and Anacostia Rivers via direct runoff, generally after rainstorms. Nonpoint sources in the District include unregulated stormwater from developed lands, forests, stream bank and tidal shoreline erosion, atmospheric deposition, fertilizer, pet waste and construction site runoff from developed areas that flows directly into the surface waters. Atmospheric deposition is considered separately from the land-based sources of nutrients and sediment and will be addressed at the federal level. Most of the District's land areas are within either the CSS or MS4 drainages; therefore stormwater from these areas is considered a point source load as opposed to a nonpoint source load.

Although most of the District's stormwater runoff is within the CSS or MS4 drainages, there are several minor facilities that discharge stormwater directly to the Potomac and Anacostia Rivers. These facilities are addressed in aggregate and are considered "Others" for the purposes of this WIP. As discussed in Section 7.4, these

facilities are included with the nonpoint source load calculations and primarily consist of Federal facilities, such as Washington Navy Yard, Joint Base Anacostia-Bolling and National Park Service properties.

5 Interim and Final Nutrient and Sediment Loads

This section addresses Element 1 of the WIP Elements: Interim and Final Nutrient and Sediment Target Loads. EPA expects the states and the District to "commit to meet the interim and final target loads" and subdivide those targets by the pollutant source sector within each of the 92 areas draining to Section 303(d) tidal water segments" (USEPA 2009a). The "amount and location of loads from individual (where possible) or, as necessary, aggregate point sources" must also be identified (USEPA 2009a).

In July 2010 EPA announced the nitrogen and phosphorus draft allocations to the jurisdictions and major basins. In August the sediment draft allocations were provided as a range. These allocations may be modified based on refinements to the Phase 5.3 Chesapeake Bay Watershed Model in 2011. The draft allocations were developed to meet the water quality standards currently proposed for adoption by Maryland, Virginia, Delaware and the District of Columbia. Chesapeake Bay watershed-wide the total nitrogen draft allocation is 203.14 million pounds per year, the total phosphorus draft allocation is 12.52 million pounds per year, and the sediment allocation is 6,066-6,673 million pounds per year.

The District of Columbia draft allocations for its portion of the Potomac Basin are 2.32 million pounds per year total nitrogen, 0.12 million pounds per year total phosphorus, and 11.16 million pounds per year of sediment. The District must meet these nutrient and sediment targets fully by 2025. This WIP further divides the total District allocation among the impaired segment-sheds within the District (POTTF_DC, POTTF_MD, ANATF_DC and ANATF_MD). The 2017 interim target is defined as removal of 60 percent of the necessary nutrient and sediment reductions compared to current loads. Table 3 summarizes the 2009 loads and the anticipated 2017 and 2025 loads for each impaired segment-shed. Although there is a 2017 interim target load representing a 60 percent reduction from the total required reduction, these reductions were not made uniformly across the four impaired segment-sheds in the District. Because most of the loading is from point sources, there is a disproportionate reduction from the impaired segment-sheds containing significant point sources. In Table 3 the segment-shed loads for 2017 and 2025 represent the anticipated loads from each of the segment-sheds, as well as the segment allocations. A District Reserve Load is available to accommodate potential future increases in loading.

It should be noted that throughout this report the total 2009 loads for the District are different than the 2009 loads indicated in the Chesapeake Bay Watershed Model Phase 5.3. This is because there were additional nonsignificant industrial facilities that were not originally included in the model. Their presence is represented in subsequent model runs; however, the 2009 scenario was not rerun with the inclusion of these facilities. The 2009 loads throughout this report account for the additional load estimated from these facilities.

Table 3. Current Loads and Interim and Final Target Loads by Impaired Segment-shed.

	Total Nitrogen (lb/yr)	Total Phosphorus (lb/yr)	Sediment (lb/yr)
Current Load (2009)[1]	**2,872,860**	**146,928**	**34,050,653**
POTTF_DC	2,522,467	95,975	10,612,493
POTTF_MD	202,140	21,442	18,042,219
ANATF_DC	132,491	26,738	4,775,248
ANATF_MD	15,763	2,773	620,693
2017 Interim Target (60%) [2,3]	**2,533,544**	**131,499**	**19,419,053**
Anticipated 2017 Load	**2,223,060**	**130,287**	**14,877,654**
POTTF_DC	2,060,706	102,463	9,600,614
POTTF_MD	19,728	809	597,798
ANATF_DC	128,045	24,853	4,200,604
ANATF_MD	14,582	2,162	478,638
2025 Final Target [2]	**2,320,432**	**121,213**	**11,158,120**
Total overall percent reduction from 2009 levels[3]	**19%**	**18%**	**67%**
POTTF_DC	2,143,763	98,089	8,148,526
POTTF_MD	18,450	686	490,768
ANATF_DC	57,320	8,813	2,093,373
ANATF_MD	13,401	1,551	336,583
District Reserve	87,498	12,074	88,870
Anticipated 2025 Load	**2,320,432**	**121,213**	**11,158,120**

[1]2009 Loads are based on the current capacities for TP and TSS in the permit limits. Actual TP loadings are lower.
[2] 2017 interim target load and 2025 target load based on the CBPO Watershed Model allocations. 2017 interim target adjusted for current TP permit limits.
[3] 2017 and 2025 percent reductions based on 2009 loading capacities for TP and TSS in the permit limits

Element 8 of the EPA WIP Guidance (Appendix with Detailed Targets and Schedule) requires detailed targets and schedules for load reductions. "EPA expects this appendix to include a reduction schedule comprising the two-year target loads at the scale of each major basin within a State or the District" (USEPA 2009a). Appendix 1 satisfies this requirement and provides further details on the load reductions discussed in Table 3.

Nearly the entirety of the District is covered as part of a regulated point source; therefore, source sector allocations were assigned based on the anticipated loading reductions from planned upgrades at various point source facilities, or on existing loads at facilities where no upgrades or changes in permit conditions are planned. The Blue Plains Outfall 001/CSO system is wet-weather driven, and therefore has a performance based allocation. The allocation is based on the expected average loading as determined by the hydrology of the years 1991-2000.

Nutrient and sediment load allocations for the MS4 and Others Area are based on anticipated loading reductions to these areas from implementation of BMPs, erosion and sediment control and a 1.2", 24-hour storm retention standard, as determined by the Chesapeake Bay Watershed Model Phase 5.3. Table 4 summarizes the waste load and load allocations for the nutrient and sediment sources in the District of Columbia.

Table 4. Nutrient and Sediment Allocations in the District of Columbia.

	Sector	Permit	Bay Segment	TN (lb/yr)	TP (lb/yr)	TSED (lb/yr)
Target Allocation				2,320,432	121,213	11,158,120
District Reserve				87,498	12,074	88,870
Waste Load Allocation	Blue Plains Outfall 002[1]	DC0021199	POTTF_DC	1,929,827	88,389	2,197,421
Waste Load Allocation	Blue Plains Outfall 001	DC0021199	POTTF_DC	134,073	4,304	354,556
Waste Load Allocation	CSOs	DC0021199	**Total**	**3,809**	**810**	**87,724**
			ANATF_DC	1,223	260	28,169
			POTTF_DC	2,586	550	59,555
Waste Load Allocation	MS4	DC0000221	**Total**	**106,388**	**11,452**	**6,204,500**
			ANATF_DC	41,517	6,498	1,682,470
			ANATF_MD	10,424	1,444	314,421
			POTTF_DC	39,427	2,975	3,843,847
			POTTF_MD	15,019	536	363,762
Waste Load Allocation	Non-significant Industrial Wastewater Dischargers	Aggregate	**Total**	**24,291**	**1,275**	**247,491**
			ANATF_DC	3,286	595	34,190
			ANATF_MD	2,361	66	12,100
			POTTF_DC	17,694	507	111,096
			POTTF_MD	950	107	90,105
Load Allocation	Others (nonpoint sources and forest)	Aggregate	**Total**	**34,546**	**2,907**	**1,977,557**
			ANATF_DC	11,293	1,459	348,544
			ANATF_MD	616	41	10,062
			POTTF_DC	20,156	1,365	1,582,051
			POTTF_MD	2,481	42	36,900

[1]Note: The loads allocated to Outfall 002 will cover any growth and/or additional flows originating in the District.

Total Sediment allocations for Blue Plains were derived from the TSS allocations assigned to the facility. The formula applied to convert from TSS loads to TSED was based on methodology provided by the Chesapeake Bay Program and is as follows:

TSED concentration = TSS concentration - (BOD concentration*0.505)

The TSS allocations for Blue Plains are summarized in Table 5. Remaining facilities were assumed to have no BOD contribution and therefore the TSS load and TSED would be identical.

Table 5. Summary of TSS Allocations for Blue Plains

Sector	TSS (lb/yr) Waste Load Allocation
Blue Plains Outfall 002	3,437,306
Blue Plains Outfall 001	438,634
CSO	105,350

6 Nutrient Reduction Progress 1985-2009

6.1 Nutrient Load Reductions

In 1983 the very first Chesapeake Bay Agreement was signed by the District of Columbia; the States of Maryland, Pennsylvania, and Virginia; the U.S. Environmental Protection Agency; the Chesapeake Bay Commission. Under this agreement the signatories pledged to work together to clean up the Bay.

Under the 1987 Chesapeake Bay Agreement, signed by the governors of Maryland, Virginia, and Pennsylvania, the mayor of the District of Columbia and the Chesapeake Bay Commission, the jurisdictions set a goal to "reduce and control point and nonpoint sources of pollution to attain the water quality condition necessary to support the living resources of the bay" (Chesapeake Executive Council 1987). Each jurisdiction committed to a 40 percent reduction of nitrogen and phosphorus delivered to the mainstem of the Chesapeake Bay by the year 2000.

The District's 2004 Tributary Strategy indicates that from 1985 to 2000, the total nitrogen load was reduced overall by 40 percent (DC DOH 2004) – showing that DC met its assigned goal before any other state was able to. Point sources achieved a 42 percent reduction and the significantly smaller load from nonpoint sources was reduced by 17 percent (DC DOH 2004). The District was able to achieve the goal of reducing total nitrogen by 40 percent, primarily through upgrades to the Blue Plains Treatment Plant, which contributed roughly 90 percent of the total nitrogen load from the District at the time (DC DOH 2004). Table 6 shows the results of the most current version of the Chesapeake Bay Program Watershed Model and the reductions that have been achieved from 1985 through 2009. The District has continued to achieve additional significant nitrogen reductions and maintained the progress made on reducing phosphorus loads since 2000.

Table 6. Comparison of Nutrient Loads in 1985 and 2009.

Nutrient Source	Modeled 1985 Load (lb/yr) (with atmospheric deposition removed)	Modeled 2009 Load (lb/yr) (with atmospheric deposition removed)	Percent Reduction
Total Nitrogen	6,195,931	2,853,212	54.0%
Point Sources	6,033,259	2,691,128	55.4%
Nonpoint Sources	162,672	162,084	0.4%
Total Phosphorus	101,760	86,376	15.1%
Point Sources	81,135	65,163	19.7%
Nonpoint Sources	20,625	21,214	+2.9%

The phosphorus reduction goal of 40 percent was not met by the year 2000; however, Blue Plains was already removing phosphorus to levels nearly at the limits of current technology, so fewer reductions were achievable from this source (DC DOH 2004). Phosphorus reductions were achieved through better management of CSOs. In 2001 Blue Plains contributed 67 percent of the District's overall phosphorus load because of the high flows through the facility (DC DOH 2004). CSO contributions to the overall nutrient load are highly dependent on the rainfall patterns from year to year.

The 2004 Tributary Strategy summarizes the history of previous upgrades to the Blue Plains Wastewater Treatments Plant that resulted in the above load reductions (DC DOH 2004):

> "The largest source of the nitrogen load attributed to the District in 1985 was from the Blue Plains Wastewater Treatment Plant. Therefore, nitrogen reduction at Blue Plains was necessary for the District to achieve its nitrogen reduction goal.
>
> Since the early 1980s the District of Columbia has investigated different nitrogen removal options for the Blue Plains Wastewater Treatment Plant. These studies included the *Blue Plains Feasibility Study* (Greeley and Hansen, 1984), *Deep Bed Denitrification Filters at Blue Plains* (Greeley and

Hansen, 1989), and *A Feasibility Study for Biological Nutrient Removal at the Blue Plains Wastewater Treatment Plant* (McNamee, Porter and Seeley, 1990).

Nitrogen removal costs from these studies were summarized in a report by the Interstate Commission on the Potomac River Basin (Camacho, 1992), and updated in a study by Engineering Science, Inc (1993) prepared for the Metropolitan Washington Council of Governments. Based on various engineering studies, three options were evaluated for the nutrient reduction strategy of the District of Columbia. They were three-stage biological nitrogen removal (BNR), five-stage BNR, and implementing the limits of technology in nitrogen removal.

After extensive research, three-stage BNR was selected as a technological upgrade for Blue Plains. With this technology, BNR is obtained by retrofitting the existing nitrification tanks to create an anoxic zone for denitrification. Methanol is added in the fourth pass in the existing nitrification reactors as a carbon source to achieve biological denitrification. It was the implementation of BNR that enabled the District to achieve its 40 percent reduction of nitrogen goal.

This technology was installed first as a pilot in 1996, treating about half of Blue Plains' total flow. In 2000, the plant applied BNR to its entire flow. A study by ICPRB found that ambient nitrate levels have significantly declined in the tidal Potomac when BNR is operating. Before and after comparisons indicate nitrogen concentrations decreased between 22 and 63 percent, depending on season and flow in the upper half of the tidal Potomac after full BNR implementation (Potomac Basin Reporter, Vo. 58 No. 6 November/December 2002)."

Similarly, the 2004 Tributary Strategy discusses Phase I of the CSO abatement efforts (DC DOH 2004):

"Historical efforts to manage wastewater and stormwater in the District of Columbia were primarily concerned with the transport of stormwater and sanitary sewage to nearby waterways for disposal. This "combined system" carries both domestic wastes and rainwater in a common sewer to the treatment plant. At the beginning of the CSO abatement program, one third of the District, approximately 12,500 acres, was served by a combined system that can overflow to waterways during rainstorms.

Although these overflows have significant impacts on all three receiving streams in the District (the Anacostia, the Potomac, and Rock Creek), the Anacostia receives a disproportionate share. The combined sewers overflow at 13 sites along the Anacostia south of RFK Stadium, accounting for 63 percent of the combined overflow in the District. The most serious results of combined sewer overflow are fecal contamination and low dissolved oxygen caused by high levels of biological waste. Storm events regularly cause violations of the official water contact recreation standards using fecal coliform bacteria. The Anacostia River also is subject to frequent fish kills and elimination of game fish species due to severe dissolved oxygen depletion. The effects of overflows have included immediate depletions of dissolved oxygen following the discharges. These oxygen depletions are sometimes so extreme that they result in large kills even of hardy carp and catfish populations, and long-term buildup of oxygen-demanding materials in bottom sediments. Another effect is the aesthetic degradation due to the discharge of combined system overflow suffered by all three streams.

In 1983 it was estimated that under normal precipitation conditions, the combined system would allow overflows 85, 80, and 17 times a year on the Anacostia, the Potomac, and Rock Creek, respectively. At that time, the District undertook a program for abatement of pollution from the combined sewer overflows. It consisted of increasing pumping capacity to direct more of the combined sewer flow to Blue Plains for treatment, increasing temporary storage of storm flows, separating combined systems in some areas, and treating CSOs at the points of discharge. The largest single investment, at a cost of $18 million ($14.5 million federal, the remaining, D.C.), of

the program has been the Northeast Boundary Swirl Concentrator. In operation since 1991, it can treat up to 400 million gallons of combined sewage per day, removing grit, reducing settleable solids, and chlorinating and dechlorinating the effluent. The District of Columbia completed phase I of the CSO abatement program with an investment of about $32.6 million (including $22.8 million federal), including the cost of the Northeast Boundary swirl concentrator.

In 1994, the USEPA issued a national CSO Policy, which requires municipalities to develop a Long Term Control Plan (LTCP) for controlling CSOs. The CSO policy became law with the passage of the federal Wet Weather Water Quality Act of 2000. In 1998, USEPA convened a "Special Panel on Combined Sewer Overflows and Stormwater Management in the District of Columbia." This panel was comprised of representatives from 25 local, regional and federal agencies that have an interest in water quality issues in the District. The panel issued its report that included a number of recommendations for the LTCP.

DC WASA submitted its LTCP Program Plan – its approach to collecting data and identifying alternatives for addressing the CSO problem to USEPA. An extensive monitoring program in accordance with a USEPA-approved Quality Assurance Project Plan was conducted from August 1999 to June 2000. The data gathered from this monitoring effort were used to develop computer models to evaluate alternatives for mitigating the impact of CSOs on receiving waters."

The LTCP is discussed in detail in Section 7.1.2.1.

Nonpoint sources of nutrients and sediment have remained relatively constant over the last 25 years. Because the point source load has been reduced by about half since 1985, the overall proportion of nitrogen coming from nonpoint sources has increased, despite the lack of change in actual loading. In 1985 nonpoint sources contributed about 2.5 percent of the nitrogen, while in 2009 nonpoint sources contributed just over 5.6 percent of the nitrogen load. Similarly, the phosphorus load from nonpoint sources has remained relatively stable, but the proportion of the overall load has increased from about 20 percent in 1985 to about 25 percent in 2009.

The 2004 Tributary Strategy details the history of nonpoint source pollution control efforts since 1985 (DC DOH 2004).

"Nonpoint is not a significant source of nutrient loads, although it a major contributor to impairment of District waters, and the District has made significant investments in its Nonpoint Source Management Program since 1985. Nonpoint source pollutants of concern in the District of Columbia are nutrients, sediment, toxicants, pathogens, and oil and grease. The origins of these nonpoint source pollutants are diverse and include:

- stormwater runoff due to the high degree of imperviousness of urban areas
- development and redevelopment activities
- urbanization of surrounding jurisdictions
- agricultural activities upstream in the watershed

The control of nonpoint source pollution requires the cooperation of many environmental programs. In 1989, the District developed *The District of Columbia Nonpoint Source Management Plan* (DC, 1989), revised and updated *by The District of Columbia Nonpoint Source Management Plan II: Addressing Polluted Runoff in an Urban Environment* (DC, June 2000). The plan describes the various environmental programs and projects in place to help control nonpoint source pollution."

7 Current Loading, Program Capacity and Projected Load Reductions

This section addresses Element 2: Current Loading Baseline and Program Capacity. Under this element, EPA expects the States and the District to "evaluate current legal, regulatory, programmatic, financial, staffing and technical capacity to deliver the target loads established in the TMDL" (USEPA 2009a).

The vast majority of the District's nutrient and sediment loads come from regulated entities. A number of facilities maintain individual NPDES permits. EPA Region 3 is the NPDES permitting authority for the District. The District has assumed responsibility for inspecting individual NPDES permitted facilities. All major facilities and two minor facilities are inspected on an annual basis. Inspection reports are submitted to EPA. The District works with EPA to correct violations and oversees implementation of correction plans. Occasionally, facilities are jointly inspected by EPA and the District. Specific details on inspection and reporting requirements for individual facilities are described in the appropriate sections below.

The District is expecting to address most nutrient reductions through implementation of permit conditions for Blue Plains wastewater treatment plant and the CSS, and sediment reductions through the permit conditions for the Washington Aqueduct. To a lesser extent nonpoint sources of nutrients and sediment will be reduced through implementation of permit conditions for the MS4 area and implementation activities in non-regulated areas. Specific facility upgrades and implementation activities and the associated nutrient and sediment reductions are discussed below.

7.1 Wastewater and CSS System

7.1.1 Existing Loads

Since 1996 the Blue Plains Wastewater Treatment Plant has been managed by the DC Water and Sewer Authority (DC WASA is now known as DC Water), a semiautonomous regional entity. All funding for operations, improvements and debt financing is obtained through usage fees, EPA grants, and the sale of revenue bonds (DC DOH 2004). The Blue Plains Inter-Municipal Agreement (IMA) between the jurisdictions served by Blue Plains governs the rates and other regional issues, such as capacity allocations, structural changes, funding and long term management of the wastewater and sludge disposal (DC DOH 2004). The 2002 Long Term Control Plan and modifications through the 2005 DC WASA Consent Decree govern the implementation of current and planned nutrient, sediment and flow reductions.

The flow allocations among the jurisdictions served by Blue Plains were negotiated through the Inter-Municipal Agreement (IMA) of 1985. Blue Plains has a rated capacity of 370 million gallons per day (MGD) on an annual average basis (DC WASA 2007). Of the total flow, the District is allocated 40 percent (148 MGD) of the total flow.

The Blue Plains Wastewater Treatment Plant and the District's Combined Sewer System (CSS) are both covered under the same permit held by DC WASA. The Blue Plains Wastewater Treatment Plant receives municipal wastewater, as well as stormwater through the combined sewer system. The Blue Plains facility has two outfalls to the Potomac River; Outfall 002 discharges only treated municipal wastewater and Outfall 001 discharges stormwater and wastewater as a CSO-related bypass. The CSS, located throughout the District has multiple discharge points. Table 7 summarizes the current nutrient and sediment loads from Outfall 002, outfall 001 and the combined loads from the CSO outfalls in the system.

Table 7. Summary of the Existing Loads from DC WASA Facilities

Outfall	Total Nitrogen (lb/yr)	Total Phosphorus (lb/yr)	Sediment (lb/yr)
Outfall 002[1]	2,387,918	81,095	2,016,107
Outfall 001	30,322	4,238	220,505
CSOs	87,111	18,598	2,013,257

[1] Based on the current capacity at TP and TSS permit limits.

The new NPDES permit for Blue Plains was issued by EPA on September 30, 2010. The current permit limits for Blue Plains wastewater effluent at Outfall 002 are an annual maximum of 4,377,580 pounds of total nitrogen, 0.18 mg/L total phosphorus and 7.0 mg/L total suspended solids ; however the total nitrogen limit is not currently being met (EPA 2010d). As outlined in the permit, upgrades to the facility to meet the total nitrogen limit must be in operational by July 2014 and in compliance with the effluent limit by January 1, 2015. Outfall 001 is a CSO-related bypass and therefore discharges vary with weather conditions. DC WASA has calculated that following the implementation of the Total Nitrogen/Wet Weather Plan the maximum discharge from Outfall 001 would be 311,420 lbs/year. Permit limits are not placed on Outfall 001 because its discharges are wet weather dependant, but monitoring is required to determine the total annual discharges. Should the total discharges exceed 311,420 pounds of total nitrogen per year, EPA will evaluate the need to adjust the allocation. There are no nutrient or sediment effluent limits for the CSS portion of DC WASA operations. Additional details on the new Blue Plains NPDES permit are available in Section 7.1.2.4.

7.1.2 Current Programs and Capacity

The District has evaluated program and technical capacity and found that with the facility upgrades required by the Blue Plains NPDES permit, the Long Term Control Plan and the Total Nitrogen Removal/Wet Weather Plan, the District has the capacity to meet the nutrient and sediment allocations assigned to Blue Plains and the CSS. The allocations are based on the permit flows and concentrations. Additional reductions beyond those required by the NPDES permit are not required. Discussed below are the programs and legal agreements that address the nutrient and sediment loads from DC WASA operations (Blue Plains and the CSS). Because they are intermingled operations, both are addressed below simultaneously.

7.1.2.1 Long Term Control Plan

A final version of a Long Term Control Plan was developed by DC WASA in 2002 for the CSS in the District. Fully implemented, the plan will control CSO discharges to District waters and improve water quality. The LTCP was originally estimated to reduce CSOs by 96 percent across the District (DC DOH 2004). General activities outlined in the LTCP include (DC WASA 2002):

- Consolidation or separation of select CSOs
- Implementation of Low Impact Development Retrofits
- Rehabilitation of Pumping Stations
- Construction of storage tunnels
- Improvements to excess flow treatment at Blue Plains

The following list, taken directly from the LTCP, describes the activities that were to be undertaken through the Recommended Control Program and Figure 9 illustrates the LTCP actions (DC WASA 2002). Some activities are already underway or complete. Others have been modified through the Total Nitrogen Removal/Wet Weather Plan and are discussed in Section 7.1.2.3.

System Wide
Low Impact Development – Retrofit (LID-R) – Advocate implementation of LID-R throughout entire District. Provide technical and regulatory assistance to District Government. Implement LID-R projects on WASA facilities where feasible.

Anacostia River
Rehabilitate Pumping Stations – Rehabilitate existing pumping stations as follows:

- Interim improvements at Main and 'O' Street Pumping Stations necessary for reliable operation until rehabilitation of stations is performed.
- Rehabilitate Main Pumping Station to 240 mgd firm sanitary capacity. Screening facilities for firm sanitary pumping capacity only.
- Rehabilitate Eastside and 'O' Street Pumping stations to 45 mgd firm sanitary capacity

- Interim improvements at existing Poplar Point Pumping Station necessary for reliable operation until replacement pumping station is constructed as part of storage tunnel.

Storage Tunnel from Poplar Point to Northeast Boundary Outfall – 49 million gallon storage tunnel between Poplar Point and Northeast Boundary. Tunnel will intercept CSOs 009 through 019 on the west side of the Anacostia. Project includes new tunnel dewatering pump station and low lift pumping station at Poplar Point.

Storage/Conveyance Tunnel Parallel to Northeast Boundary Sewer – 77 million gallon storage/conveyance tunnel parallel to the Northeast Boundary Sewer. Also includes side tunnels from main tunnel along West Virginia and Mt. Olivet Avenues, NE and Rhode Island and 4th St NE to relieve flooding. Abandon Northeast Boundary Swirl Facility upon completion of main tunnel.

Outfall Consolidation – Consolidate the following CSOs in the Anacostia Marina area: CSO 016, 017 and 018

Separate CSO 006 – Separate this CSO in the Fort Stanton Drainage Area

Ft Stanton Interceptor – Pipeline from Fort Stanton to Poplar Point to convey CSO 005, 006 and 007 on the east side of the Anacostia to the storage tunnel.

Rock Creek
Separate Luzon Valley – Completed in 2002.

Separation – Separate CSOs 031, 037, 053, and 058.

Monitoring at CSO 033, 036, 047 and 057 – Conduct monitoring to confirm prediction of overflows. If overflows confirmed, then perform the following:

- Regulator Improvements: Improve regulators for CSO 033, 036, 047 and 057
- Connection to Potomac Storage Tunnel: Relieve Rock Creek Main Interceptor to proposed Potomac Storage Tunnel when it is constructed

Storage Tunnel for Piney Branch (CSO 049) – Construct 9.5 million gallon storage tunnel.

Potomac River
Rehabilitate Potomac Pumping Station – Rehabilitate station to firm 460 mgd pumping capacity

Outfall Consolidation – Consolidate CSOs 023 through 028 in the Georgetown Waterfront Area.

Potomac Storage Tunnel – 58 million gallon storage tunnel from Georgetown to Potomac Pumping Station. Includes tunnel dewatering pumping station.

Blue Plains Wastewater Treatment Plant
Excess Flow Treatment Improvements – Construct Four new primary clarifiers, improvements to excess flow treatment control and operations

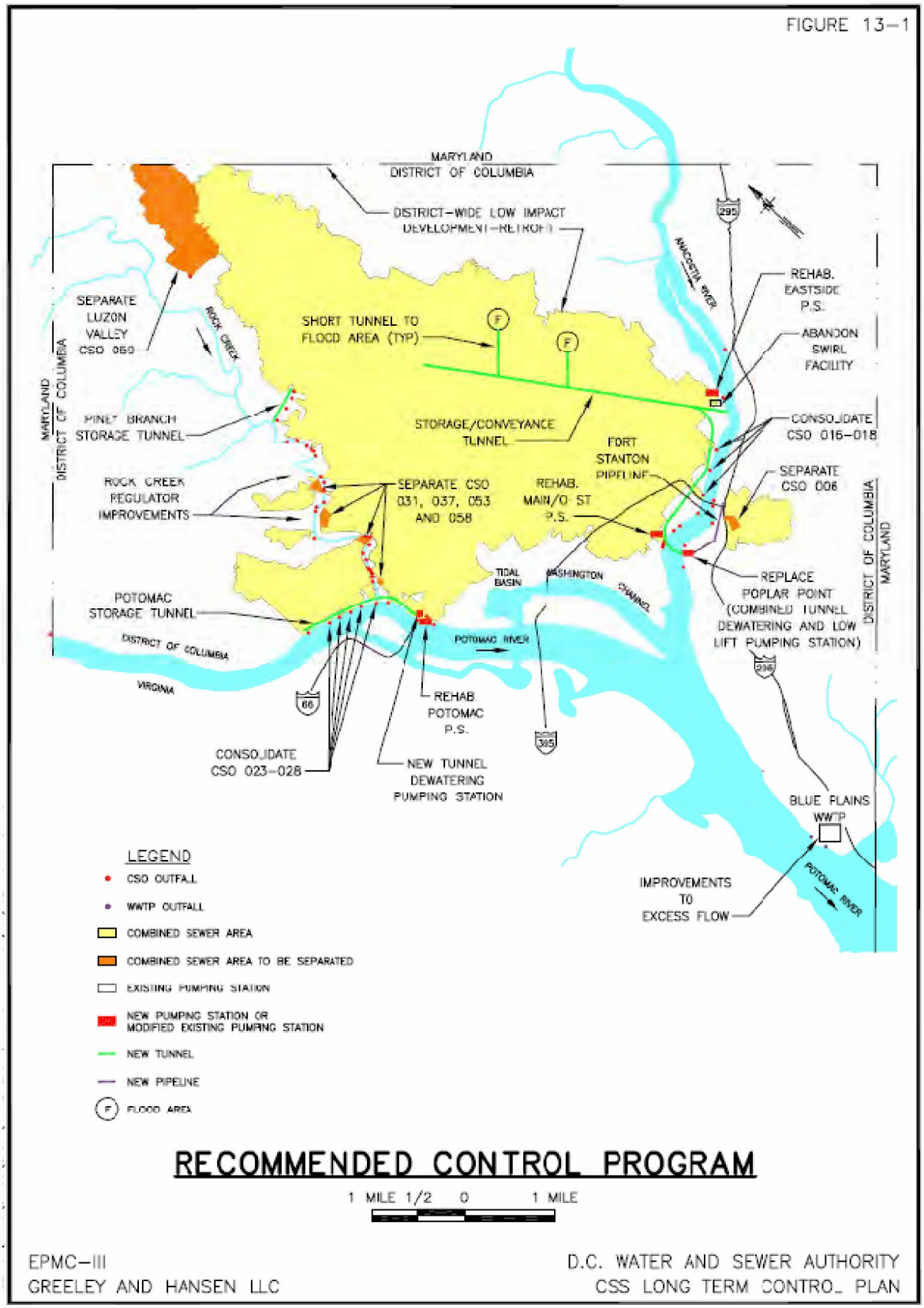

Figure 9. Illustration of the recommended control program in the Long Term Control Plan.

The LTCP provides detailed information on the use of LID-R to mimic predevelopment site hydrology by using site design techniques that "store, infiltrate, evaporate, and detain runoff from rainfall events" (DC WASA 2002). It is anticipated that while LID-R can contribute to the control of CSOs, it is not sufficient on its own. The LTCP recommends coupling LID-R with structural controls to reduce CSOs (DC WASA 2002). Three LID-R measures were selected as part of the LTCP. These are listed below (DC WASA 2002):

1. "LID-R at WASA Facilities – Incorporate LID-R techniques into new construction or reconstruction on WASA facilities, where applicable
2. Re-Evaluate the Sizes of the Potomac and Rock Creek Storage Tunnels – Based on the results of WASA demonstration projects, other current LID information, and on the actual application of LID-R in the District at the time, re-evaluate the sizing of the Rock Creek and Potomac Storage Tunnels. Modify the LTCP as appropriate.
3. Advocate for LID-R – As stormwater administrator, be an advocate for the implementation for LID-R and provide technical and management guidance where feasible."

The LTCP also made recommendations for institutional change to encourage LID-R. These DC WASA recommendations and the applicable agencies include the following (DC WASA 2002):

Public Education

1. Develop a public education program to encourage the use of LID-R in the District (District, Federal Government)

Change Development/Redevelopment Regulations

2. Adopt building code provisions that allow and encourage LID-R. (District)
3. Consider requiring LID-R for land disturbing activities greater than a threshold dollar amount for redevelopment. The LID–R requirement would be to reduce stormwater runoff to levels that approach the natural environment prior to human development. This is more stringent than the requirement of no net increase in stormwater. (District)
4. Consider encouraging LID-R on a voluntary basis by associating it with the building permit process. To obtain a permit, the permittee would need to comply with the LID-R requirements adopted. A financial incentive could be provided in terms of a reduced building permit fee, tax incentives or a reduced stormwater fee. Literature and approaches could be provided to permittees with the building permit application material handed out to each permittee. (District)

Change Government Practices

5. Consider revising Department of Public Works standard details to include LID-R measures as part of transportation construction. (District)
6. Develop government construction guidelines used in redevelopment and new projects that incorporate LID-R. For example, some cities have policies requiring that 'open' designs be implemented to reduce the presence of hidden, out of the way places where crime is more likely. Others have development guidelines requiring historically correct façades on new buildings in historic neighborhoods. Similar voluntary guidelines incorporating LID-R could be adopted by the District government, federal government, military facilities and institutions. (District, Federal Government)

Provide Financial Incentives

7. Consider a partial credit in the stormwater fee to individuals/groups implementing LID-R. (District)
8. Consider a tax rebate to individuals/groups implementing LID-R. (District, Federal Government)
9. Consider a revolving loan fund for LID-R implementation. (District, Federal Government)

Many of the projects included in the LTCP are part of the existing Capital Improvement Program (CIP). These projects have been budgeted and scheduled and will be implemented even in the absence of the LTCP. The remainder of the projects require additional funding in order to be implemented. Projects in the CIP include (DC WASA 2002):

- Low Impact Development Retrofit Program
- Anacostia River Projects
    - Rehabilitate Main and "O" Street Pumping Stations

  - Rehabilitate Eastside Pumping Station
  - Rehabilitate Poplar Point Pumping Station
- Potomac River Project
  - Rehabilitate Potomac Pumping Station

Many of the projects in the LTCP are discussed in the 2005 DC WASA Consent Decree or were modified in the Blue Plains Total Nitrogen/Wet Weather Plan, and are discussed in greater detail in the relevant sections.

The LTCP also discusses other DC WASA programs not associated with the LTCP but that will contribute to additional CSO reductions (DC WASA 2002). These include:

- Water Conservation and Wastewater Flow Reduction Programs – These are designed to reduce dry weather flows.
- Sewer System Assessment – This program assesses the condition and capacity of the sewer system and develops recommendations for rehabilitation, upgrades, downspout disconnections, selective CSS separations and projects to reduce inflow and infiltration.
- Tide Gate Replacement – Tide gates are being replaced at CSO outfalls, which will reduce the amount of water entering the CSS, allowing for more capacity to capture stormwater and reduce overflows.

7.1.2.2 LTCP 2005 Consent Decree

The 2005 Consent Decree settled suits filed by the Anacostia Watershed Society et al. and the EPA against DC WASA and the District for failure to comply with District water quality standards, effluent limitations and other conditions established in the NPDES permit and for failing to properly manage, operate and maintain the CSO control facilities and the CSS (U.S. District Court 2005). The 2005 Consent Decree mandated a number of selected CSO Controls (U.S. District Court 2005), some of which were later modified as a result of the Total Nitrogen Removal /Wet Weather Plan, discussed in the following section. Table 8 summarizes the schedule of implementation activities associated with the LTCP 2005 Consent Decree.

- **Anacostia River Projects**
  - Rehabilitation of Main, "O" Street and Eastside Pumping Stations
  - Separate Fort Stanton Drainage Area (Outfall 006) – CSO elimination
  - Fort Stanton Interceptor – interceptor pipeline to carry flows from CSO outfalls 005 and 007 to the Storage/Conveyance Tunnel at Poplar Point.
  - Construct Storage/Conveyance Tunnel from Poplar Point to Northeast Boundary – stores combined sewer flow from the Main and O Street Pumping Station site, CSOs along Navy Yard and M Street and the Northeast Boundary CSO.
  - Improve Poplar Point Pumping Station
  - Construct Storage/Conveyance Tunnel parallel to Northeast Boundary Sewer
  - Construct side tunnels from Storage/Conveyance Tunnel along Northeast Boundary Side
  - Consolidate Anacostia combined sewer outfall consolidation to the Storage/Conveyance Tunnel – eliminating outfalls 016, 017, and 018.
- **Potomac River Projects**
  - Start Facility Plan for Potomac River Projects by 2015 and developed implementation schedule by 2018.
  - Rehabilitate existing Potomac Pumping Station
  - Construct new Potomac Tunnel Dewatering Pumping Station
  - Construct Potomac Storage/Conveyance Tunnel to store combined sewer flow from Georgetown CSOs and large CSOs downstream of Rock Creek.
  - Consolidate and direct flow from outfalls 024, 025, 026, 027 and 028 to Potomac Storage/Conveyance Tunnel.

- **Rock Creek Projects**
  - Start Facility Plan for Rock Creek Projects by 2016 and develop implementation schedule by 2019.
  - Separate combined sewer areas tributary to CSO outfalls 031, 037, 053 and 058.
  - Provide monitoring data for CSOs 033, 036, 047 and 057 to EPA
  - Depending on monitoring data, make regulator improvement and provide relief of the Rock Creek Main Interceptor or design relief interceptor parallel to Rock Creek Interceptor.
  - Construct Piney Branch Storage Tunnel
- **Blue Plains Wastewater Treatment Plant Projects**
  - Excess Flow Improvements – to ensure availability and reliability of the full 336 MGD excess flow treatment capacity at Outfall 001.
- **Low Impact Development Retrofit**
  - Incorporate LIDR techniques into new and reconstruction on DC WASA facilities as demonstration projects.
  - Collect monitoring data on effectiveness of LIDR at reducing runoff that reaches combined sewer and surface waters.

According to the DC WASA FY2009-FY2018 Approved CIP budget, the cost and schedule to implement the LTCP includes (DC WASA 2010f):

- "$1.67 billion to construct a ten mile tunnel system to control Anacostia River overflows, three miles of branch tunnels to relieve surface flooding and a tunnels dewatering pumping station with project completion in FY 2025.
- $419 million to construct a three-mile tunnel system to control Potomac River overflows and a lift station, with facility planning to begin in 2015 and project completion in FY 2025.
- $70 million to construct a mile long tunnel system to control Piney Branch/Rock Creek overflows, with facility planning to begin in 2016 and project completion in FY2025.
- Potomac Pumping Station rehabilitation - lifetime budget of $20.1 million, provides for replacing pump motors, motor controls, adding variable speed drives, upgrading the electrical system and electrical feeders, and modifying the existing wet-wells and influent channels. The rehabilitation of the pumping equipment has been completed and placed in service. Completion of this station is expected in FY 2010.
- Main & "O' Street Pumping Stations rehabilitation - project lifetime budget of $75.9 million, provides for rebuilding and upgrading sanitary pumps, upgrading electrical and ventilation systems, replacing screens and, installing a screening handling system, and installing odor control systems. All major functional equipment has been placed in service. Final completion is expected in FY 2010.
- Poplar Point Pumping Station rehabilitation - lifetime budget of $9.7 million, provides for improvements that include replacement of the pump motors and controls and rehabilitation of the pumps, structural and architectural repairs, HVAC upgrades, the addition of an odor control system, and electrical and lighting upgrades. Design of the station is complete and construction will begin in FY 2010.
- Northeast Boundary Swirl Facility - lifetime budget of $4.5 million, provides for a partial rehabilitation of this facility including the replacement of the chemical feed systems, partial replacement of the electrical system and the replacement of other components damaged by flooding and chemicals. The design phase of the project has begun.
- DC WASA Low Impact Development Projects - lifetime budget of $3.0 million, is designed to control wet weather related pollution from DC WASA owned facilities as part of the agreement for the LTCP. LID technology will be evaluated for its effectiveness in controlling stormwater runoff and improvement in water quality. Implementation of LID technologies has begun at several facilities; the design of the remaining facilities will be completed in FY 2010.
- Rock Creek CSO Projects - lifetime budget of $18.1 million provides for the design of modifications to various regulator structures and the separation of several segments of the combined sewer system. And the separation of sanitary and storm sewers in the Rock Creek basin. Construction has begun and is expected to be completed in FY 2012.

- Outfall Sewer Rehabilitation - lifetime budget of $56 million provides for the rehabilitation of approximately 20,000 feet of the influent sewers to Blue Plains AWT to ensure reliable conveyance of 1076 mgd by April 2011. This project will rehabilitate approximately 4 miles of the Outfall Sewers. In accordance with the decree, DC WASA has requested approximately a 4 year extension to 2011 to convey 1076 mgd until the rehabilitation project is complete. The cost of this project has been incorporated within the ten-year capital plan to ensure that the benefits of the Long Term Control Plan can be fully realized and that DC WASA is in complete compliance with all requirements."

7.1.2.3 Blue Plains Total Nitrogen Removal / Wet Weather Plan

In response to the Blue Plains NPDES permit modifications in 2007, DC WASA developed the LTCP Supplement Number 1 – Blue Plains Total Nitrogen Removal/Wet Weather Plan (DC WASA 2007). The existing facilities at Blue Plains are unable to meet both the NPDES permit conditions for wet weather flow treatment and the new total nitrogen effluent limit; therefore, new projects were evaluated to determine their ability to meet both conditions. Several alternatives were considered, and Alternative D was selected. Under this alternative, the District expects to meet the total nitrogen target load by 2015. Table 8 summarizes the upgrade schedule for Blue Plains. Alternative D includes the following (DC WASA 2007):

- "Blue Plains complete treatment capacity - Blue Plains will provide complete treatment for up to 555 mgd for the first four hours and 511 mgd thereafter. In accordance with the existing NPDES permit, combined sewer system flow (CSSF) conditions (i.e. wet weather events) exist and start when plant influent flow is greater than 511 mgd. CSSF conditions stop four hours after plant influent flow drops below 511 mgd or 4 hours has elapsed since the start of CSSF conditions, whichever occurs last.
- Enhanced nitrogen removal (ENR) – ENR facilities will be constructed with capacity to provide complete treatment for the flow rates identified above and to meet the new total nitrogen effluent limit. ENR technologies to meet the new total nitrogen effluent limit will be evaluated. Technologies that may be evaluated include conventional nitrification/denitrification reactors, moving bed biofilm reactors (MBBRs), biological anoxic flooded filters (BAFs) and integrated fixed film activated sludge (IFAS). The evaluation will include pilot studies of one or more technologies to select the appropriate process and to obtain detailed information on parameters for design.
- Enhanced Clarification Facility (ECF) – a 225 mgd ECF facility will be constructed at Blue Plains. Pilot testing of this treatment technology will be performed to confirm its suitability and parameters for design.
- Tunnel to Blue Plains and System Storage Volume – a new tunnel will be constructed from Poplar Point to Blue Plains. The total tunnels system storage volume will be increased from the 126 mg included in the LTCP to 157 mg. The diameters of the tunnels system and the apportionment of the storage volume among the various tunnel sections will be dependent on facility planning. This new tunnel segment will serve as a flow equalization facility which provides for reducing the capacity of the ECF and peak flow rates to complete treatment.
- Outfall Sewer Overflow to Blue Plains Tunnel – a connection between the existing Outfall sewers on the influent side of Blue Plains and the tunnel to Blue Plains will be constructed. This facility will allow flow from the collection system that exceeds the complete treatment capacity of the plant to overflow to the tunnel.
- Tunnel Dewatering Pumping Station – in the Final LTCP, the tunnel dewatering pumping station was to be constructed at the tunnel terminus at Poplar Point. As part of the TN/WW plan, the tunnel dewatering pumping station at Poplar Point will be deleted and constructed at the new terminus of the tunnel at Blue Plains. The pumping station will be sized to have a minimum firm capacity of 225 mgd, equal to the capacity of the ECF. In addition, the facility will have the

ability to dewater the tunnels system to the new ECF and discharge ECF effluent to complete treatment for discharge at Outfall 002 or for discharge at Outfall 001."

The Blue Plains Total Nitrogen Removal/Wet Weather Plan describes the operation of the recommended plan during a typical rain event (DC WASA 2007):

- "As rain occurs in the collection system, flows to Blue Plains will exceed 511 mgd, triggering the start of CSSF conditions.
- For the first four hours, flows up to 555 mgd will be conveyed to complete treatment and be discharged at Outfall 002. Flows in excess of 555 mgd that are conveyed by the collection system (up to 1076 mgd) will overflow to the tunnel. In accordance with the LTCP, CSOs on the Anacostia River will also be captured by the tunnel up to the diversion capacity specified in the NPDES Permit. The tunnel dewatering pumping station will pump up to 225 mgd to ECF for treatment and discharge at Outfall 001.
- If the storm lasts long enough, the amount conveyed to complete treatment will be reduced from 555 mgd for the first four hours and 511 mgd thereafter. The difference between the available complete treatment capacity and the flow conveyed by the collection system will overflow to the tunnel.
- If the storm is large enough, the tunnel system may fill up and then it will overflow to the receiving waters.
- When the storm recedes, flows from the collection system will decline. If flows from the collection system drop below the available complete treatment capacity (555 mgd for the first four hours and 511 mgd thereafter), a portion of the flow from ECF will be diverted to complete treatment to maintain the flow through complete treatment at its design capacity. The balance of the flow from ECF will be disinfected and discharged at Outfall 001. This approach maximizes the flow receiving complete treatment."

Specific activities outlined in the LTCP and the LTCP Consent Decree were modified to reflect the Total Nitrogen / Wet Weather Plan. These included (DC WASA 2007):

- Increase the Anacostia Projects tunnel storage capacities
- Adjust the work included for the Poplar Point Pumping Station
- Delete the Blue Plains Excess Flow improvements, including the four additional primary clarifiers
- Add the new tunnel to Blue Plains
- Add the new ECF and pumping complex at Blue Plains

The Enhanced Nitrogen Removal (ENR) facilities will provide complete treatment for the flow rates listed above (555 MGD for the first 4 hours and 511 MGD thereafter) and will meet the new nitrogen effluent limit at Outfall 002. According to DC WASA, ENR facilities are to be placed into operation by July 14, 2014 and will begin compliance with the TN effluent limit by January 1, 2015 (Siddique 2010). Table 8 provides a summary of the milestones for this upgrade. Resulting effluent limits were derived based on the 2010 permit and information provided by DC Water. Figure 10 shows the planned upgrades at Blue Plains, including an illustration of the new tunnels that will be constructed, the consolidation of CSOs and the flow scheme leading to Outfall 001 and Outfall 002. The most recent estimated capital cost for this project is about $977 million.

Table 8. Summary of Blue Plains and Long Term Control Plan Schedule of Upgrades and Water Quality Improvements

Outfall	Activity	Date	Resulting effluent limit
002 - ENR upgrade to Complete Treatment	Award Contract for Design	June 1, 2009	No change
002 - ENR upgrade to Complete Treatment	Award Contract for construction	December 31, 2011	No change
002 - ENR upgrade to Complete Treatment	Place ENR in operation	July 14, 2014	Begin effluent reductions
002 - ENR upgrade to Complete Treatment	Compliance with TN Effluent Limit	January 2, 2015	3.89 mg/L TN at Outfall 002

Outfall	Activity	Date	Resulting effluent limit
001 – Wet Weather Facilities (ECF, Tunnel to Blue Plains, Tunnel Dewatering Pumping Station	Facilities in operation	March 23, 2018	8.1 mg/L TN 0.26 mg/L TP 26.5 mg/L TSS at Outfall 001
LTCP Consent Decree – CSO Anacostia River Projects: • Poplar Point to Northeast Boundary Tunnel • Anacostia Outfall Consolidation • Poplar Point Pumping Station • Fort Stanton Interceptor	Place in Operation	March 23, 2018	4.7 mg/L TN 1.0 mg/L TP 130 mg/L TSS
LTCP Consent Decree – CSO Anacostia River Projects: • Storage/ Conveyance Tunnel Parallel to Northeast Boundary Sewer • Northeast Boundary Side Tunnels	Place in Operation	March 23, 2025	4.7 mg/L TN 1.0 mg/L TP 130 mg/L TSS
LTCP Consent Decree – CSO Potomac River Projects	Submit to EPA a summary report and detailed implementation schedule	2018	No change
LTCP Consent Decree – CSO Potomac River Projects	Place in Operation	2025	4.7 mg/L TN 1.0 mg/L TP 130 mg/L TSS
LTCP Consent Decree – CSO Rock Creek Projects	Submit to EPA a summary report and detailed implementation schedule	2019	No change
LTCP Consent Decree – CSO Rock Creek Projects	Place in Operation	2025	4.7 mg/L TN 1.0 mg/L TP 130 mg/L TSS

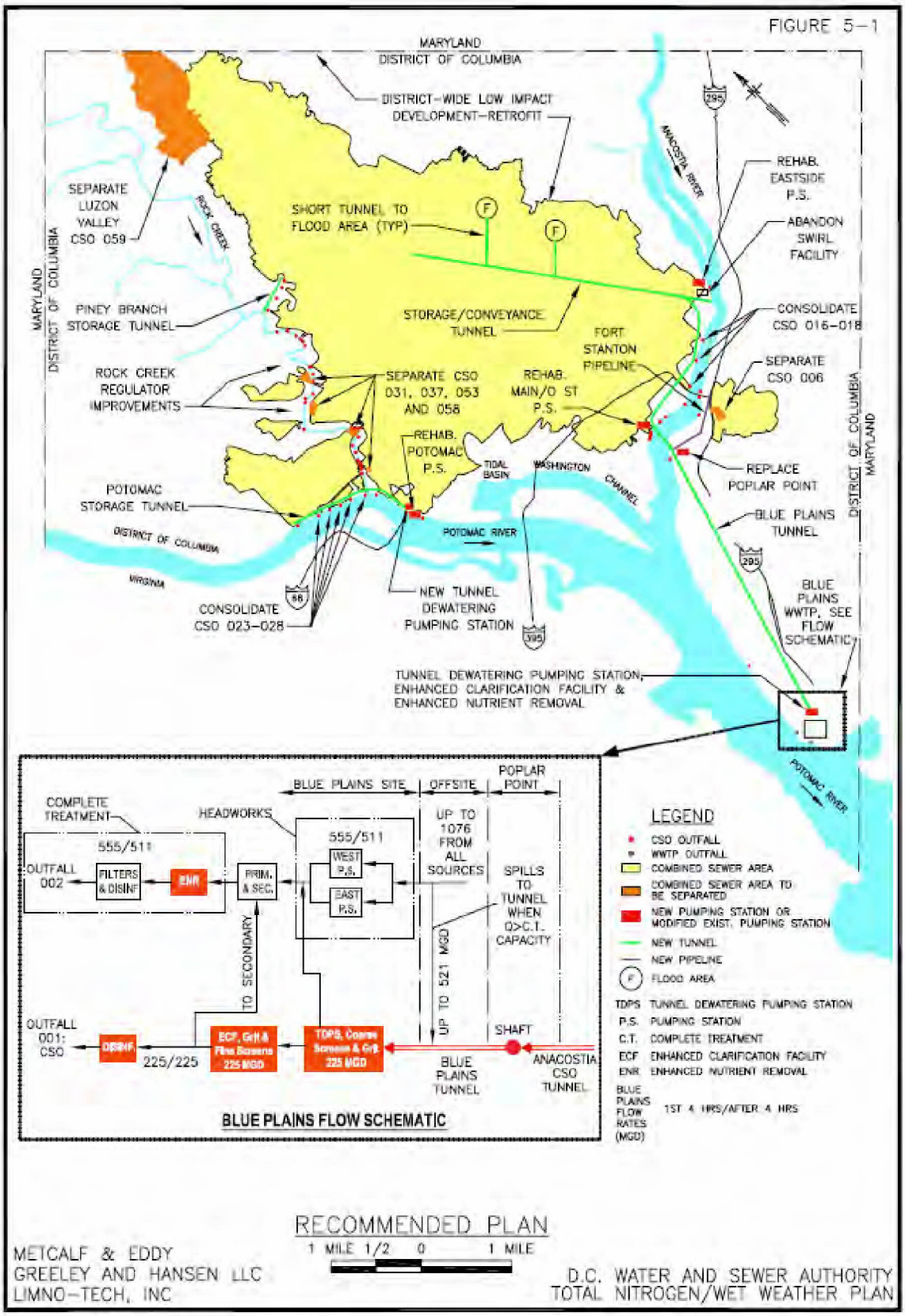

Figure 10. Planned Upgrades at the Blue Plains facility and the CSS area.

7.1.2.4 DC WASA Permit

The new NPDES permit, issued on September 30, 2010, was revised to reflect the changes resulting from the selection of Alternative D in the LTCP Supplement No.1. The total phosphorus effluent concentration remains the same (0.18 mg/L). The permit limit for total nitrogen is 4,377,580 pounds per year at Outfall 002 (USEPA 2010d). At an annual treatment capacity of 370 MGD, this is 3.89 mg/L (USEPA 2010d).

Outfall 001 will be considered a CSO-Related Bypass. Inflows discharged from Outfall 001 will receive excess flow treatment until the ECF is operational, after which, influent will receive ECF, followed by disinfection and dechlorination (USEPA 2010d). Once the ECF is installed, up to 225 mgd can be treated. There are no permit limits for flow or concentration; however no discharge of flow from the Blue Plains Tunnel from Outfall 001 is permitted during dry weather flows (USEPA 2010d). Monitoring will determine the performance of the Outfall 001 system. Flows can be reported through direct metering or calculations using the results from multiple meters (USEPA 2010d). Total nitrogen, total phosphorus and total suspended solids are required to be monitored per discharge as composite grab samples (USEPA 2010d).

7.1.3 Current Progress on Planned Implementation Activities and Implementation Schedule

Some of the projects included in the 2005 Consent Decree are already completed or in progress. These include:

- Separate Fort Stanton – CSO 006 eliminated in 2010 (DC WASA 2010b)
- Monitoring at CSOs 033, 036, 047, 057 and implementation plan design - completed in 2008 (DC WASA 2010b)
- Main and O Street Pumping Station Rehabilitation –completed
- East Side Pumping Station Rehabilitation – completed
- Poplar Point Pumping Station Rehabilitation – design phase
- Northeast Boundary Swirl Facility – operating
- Low Impact Development Retrofits – constructed at Bryant Street and Eastside Pumping Station
- Rock Creek Sewer Separations – CSO 031, 037, 053 and 058 anticipated completion by 2011

7.1.4 Expected Load Reductions

Table 9 summarizes the expected load reductions the District anticipates based on the implementation activities at Blue Plains and the CSS. With the Enhanced Nitrogen Removal upgrades at Blue Plains, the total nitrogen target limit for 2025 will be reached in 2015, significantly earlier than is required. Blue Plains is treating waste water near the limits of technology; therefore no further reductions in total phosphorus are expected from Outfall 002. The current and anticipated future loads from Outfall 001/CSO are based on the annual average flows from 1991-2000 and are developed by employing the LTCP model. The predicted loads are the arithmetic average for the wet weather events for the ten year period using rainfall recorded at Reagan National Airport. Compliance at Outfall 001/CSO will be performance based and will be determined based on average hydrology. Figure 11 through Figure 13 illustrate the nutrient and sediment loads over time in comparison to the allocations. The allocation for Outfall 002 includes additional amount of nutrients and sediment to cover increased flows from the District. The allocation for growth is discussed in detail in Section 9.

Allocations assigned to Blue Plains may be transferred away from Blue Plains or reallocated, so long as (a) any local jurisdiction or agency that is acquiring additional treatment flow capacity in Blue Plains first makes provision for replacing the transferred or reallocated allocations on a pound-for pound basis, or (b) DCWASA has confirmed in writing that the failure to replace the transferred allocations on a pound-for-pound basis will not adversely affect DCWASA's ability to comply with its permit. Nutrient allocations transferred away from Blue Plains may be transferred to or used on a pound-for-pound basis at one or more existing, expanded or new treatment plants to accommodate treatment flow capacity that is transferred away from Blue Plains. The District's allocation remains the property of the District of Columbia and shall be used accordingly.

Table 9. Summary of the loads expected to result from upgrades to the Blue Plains Outfalls 001, 002 and the CSS

Year	Activity		TN (lb/yr)	TP (lb/yr)	TSED (lb/yr)
2009[1]	Current Conditions	Total	2,505,351	103,931	4,249,869
		Outfall 002	2,387,918	81,095	2,016,107
		Outfall 001	30,322	4,238	220,505
		CSO	87,111	18,598	2,013,257
2015	Blue Plains Outfall 002 ENR Upgrades	Total	2,047,260	111,225	4,431,183
		Outfall 002	1,929,827	88,389	2,197,421
		Outfall 001	30,322	4,238	2,674,510
		CSO	87,111	18,598	2,013,257
2025	Anacostia and Potomac CSO Projects	Total	2,067,709	93,503	2,639,701
		Outfall 002	1,929,827	88,389	2,197,421
		Outfall 001	134,073	4,304	354,556
		CSO	3,809	810	87,724

[1] Based on the current capacity at TP and TSS permit limits.

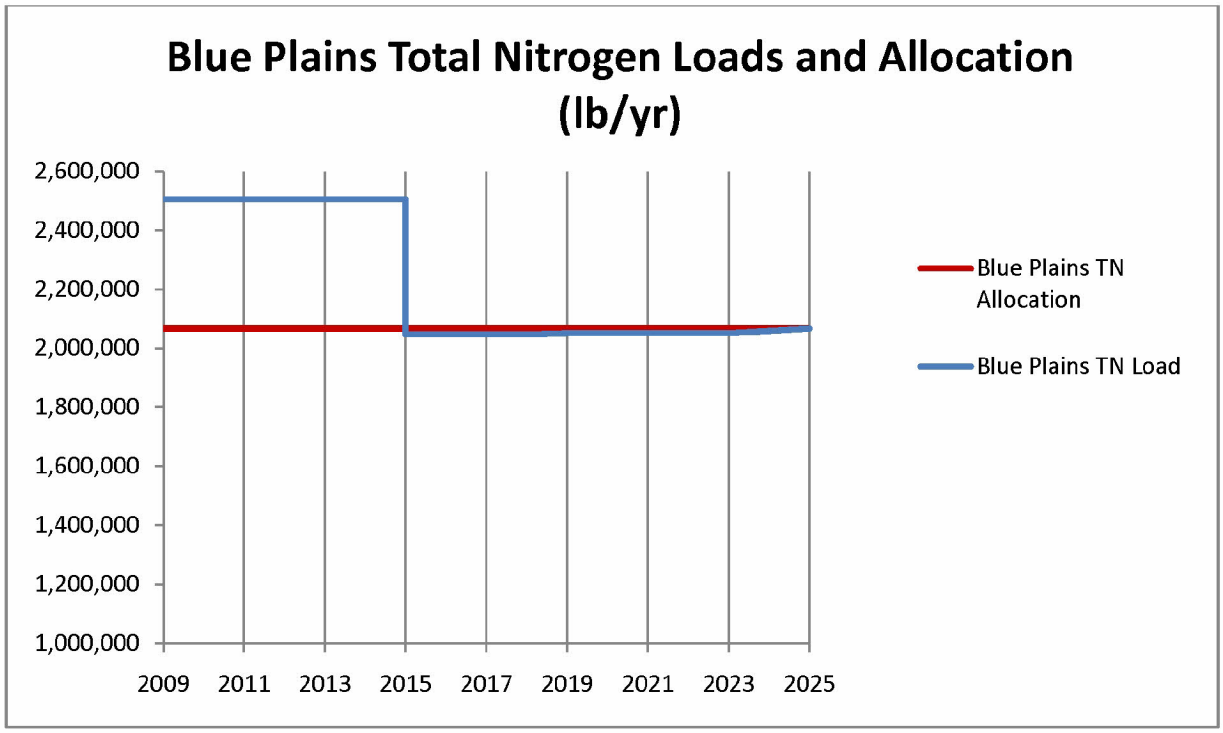

Figure 11. Blue Plains total nitrogen loading and allocation.

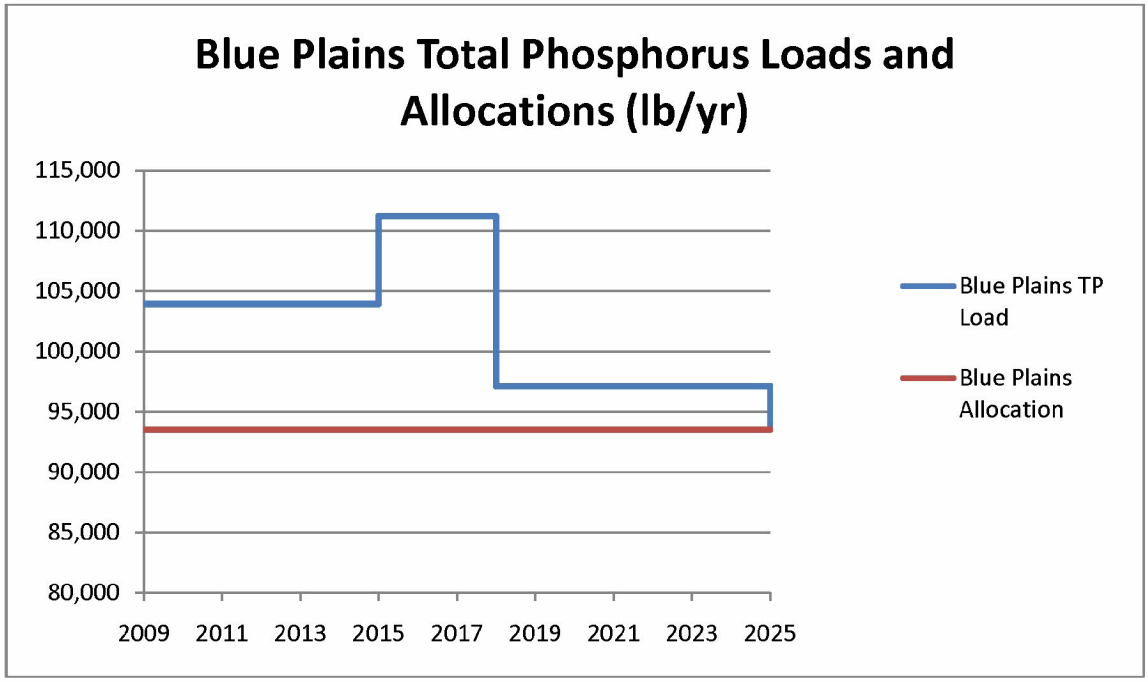

Figure 12. Blue Plains total phosphorus loading and allocation.

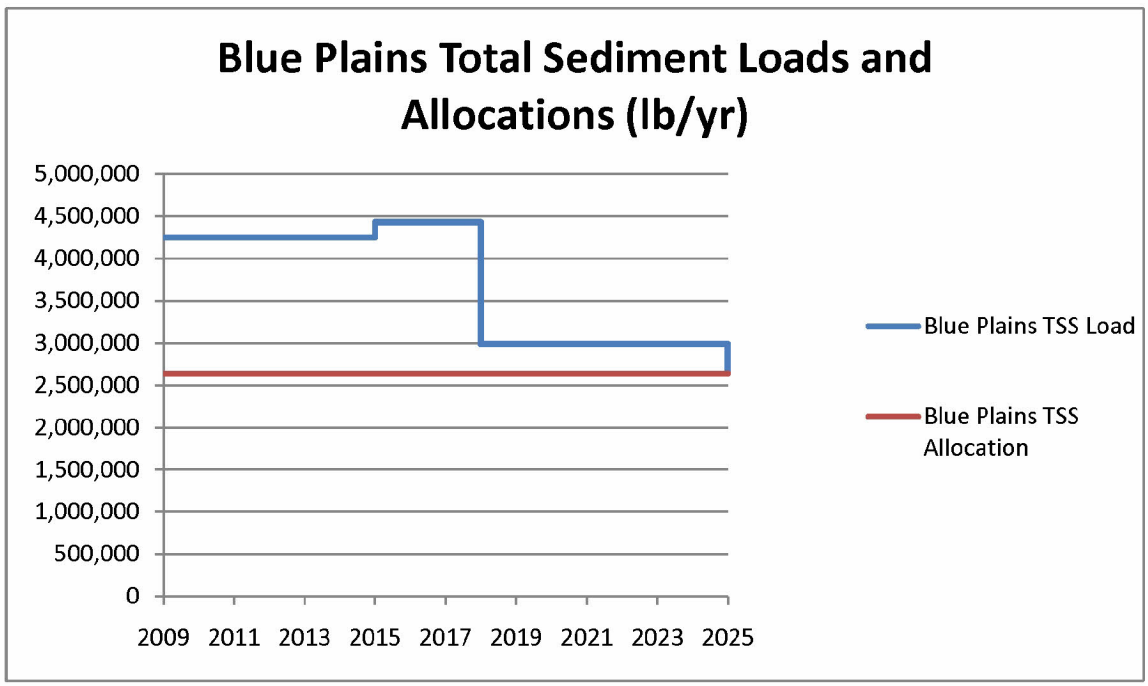

Figure 13. Blue Plains total suspended solids loading and allocation.

7.1.5 Funding Capacity

DC WASA charges an Impervious Area Charge (IAC) that is based on the amount of impervious surface at a commercial or residential property. This fee is specifically to fund implementation of the Long Term Control Plan. Currently the fee is $2.20 per Equivalent Residential Unit (ERU), the fee will increase to $3.45 per ERU beginning in FY11 (DC WASA 2010c). Implementation of the LTCP is anticipated to cost $2.7 billion but reduce CSOs by 96 percent overall (DC WASA 2009) Project components addressing the Anacostia River overflows will cost $1.7 billion and with the first phase completed by 2018 (DC WASA 2010d). The remainder

of the expenditures will occur after 2018. To address these funding requirements, DC WASA anticipates spending between $30.9 million and $170 million annually through FY 2017 and $80 million to $240 million annually through 2025 (DC WASA 2010d). The IAC is expected to contribute to the expense of fully implementing the LTCP. The Blue Plains ENR upgrade for wastewater at Outfall 002 is expected to cost $977 million (DC WASA 2010d). Some of the activities required by the LTCP are included in, and budgeted for, in DC WASA's Capital Improvement Program.

In addition to the funding for the LTCP obtained through the Impervious Area Charge, DC WASA has a history of receiving federal funds to implement the LTCP. DC WASA received $8 million in FY2008, $16 million in FY2009 and $20 million in FY2010. (DC WASA 2010b). The District and DC WASA will work with Federal partners and the EPA to obtain additional funding resources to fully implement the planned upgrades to Blue Plains and the CSS.

7.2 MS4

The District expects to implement a portion of its necessary load reductions through implementation of BMPs to lands within the MS4 areas. Nonpoint source pollution reduction strategies will result in an 11 percent reduction in the total nitrogen, 27 percent reduction in the total phosphorus and 26 percent reduction in the sediment loads the MS4 contributes to the Chesapeake Bay. These nutrient and sediment reductions are summarized in Section 7.2.5. The programs and resources that will be utilized to achieve these reductions are discussed in the following sections.

The Chesapeake Bay Watershed Model Phase 5.3 output results do not explicitly identify the loading from MS4 and Other Areas individually. An attempt was made to estimate the loads contributed by these two sectors on a per-segment basis. For the 2009 loads, the load contribution from all nonpoint source land uses was proportionally distributed to the MS4 and Other Areas sectors based on the percent area covered by each of these sectors in each of the Bay segments. This methodology is different than that applied in the draft Phase I WIP submitted to EPA in September 2010; however, the current methodology more accurately represents the loading from the MS4 and Other Areas.

The final model run used to derive anticipated 2025 loading incorporate revised land use data, so the distribution of MS4 and Other Areas is not directly comparable between 2009 and 2025 model results. To attempt to correct for this and obtain the most accurate 2025 loads for MS4 and Other Areas, a slightly different methodology was used to apportion the loads. All high density pervious and impervious land use and barren/construction loads in each segment were assigned to the MS4 sector, and the corresponding acreages were noted. This MS4 acreage was compared to the District's data on actual MS4 acreage within each Bay segment. For all segments, the high density land uses and barren/construction land use underestimated the MS4 acreage. To correct for this and achieve the appropriate MS4 load, a portion of the low density pervious and impervious land use acreage and associated loads were assigned to the MS4 at the level necessary to reflect the MS4 acreage in each segment, as determined from the District's MS4 acreage data. This yielded an assumed MS4 load for each Bay segment. The remaining 2025 nonpoint source land use loads were assigned to the Other Areas.

7.2.1 Existing loads

Table 10 summarizes the current nutrient and sediment loads from the MS4.

Table 10. Current Loads from the MS4

Year		Total Nitrogen (lb/yr)	Total Phosphorus (lb/yr)	Sediment (lb/yr)
2009	ANATF_DC	47,130	8,958	2,429,170
	ANATF_MD	12,617	2,549	572,918
	POTTF_DC	42,011	3,736	4,904,197
	POTTF_MD	18,288	753	560,577

7.2.2 Current Programs and Capacity

In 1974 the District established a soil erosion and sediment control program, followed by the development of a stormwater management program in 1984. These programs are intended to provide a regulatory mechanism to control nonpoint source pollution from construction sites using BMPs.

In 2006 the Watershed Protection Division (WPD) was formed within the newly formed District Department of the Environment. The WPD works to protect the Districts watersheds from soil erosion and nonpoint source pollution. The WPD manages both the District's Chesapeake Bay and Nonpoint Source Management implementation grants from the U.S. Environmental Protection Agency.

Many of the nonpoint source activities in the District are now covered under the District of Columbia's NPDES Municipal Separate Storm Sewer System (MS4) permit from USEPA. EPA first granted a 5-year MS4 permit to the District on April 19, 2000, with a new permit issued on August 19, 2004. The 2004 permit expired on August 18, 2009. The current MS4 permit for the District of Columbia has been administratively extended since August 18, 2009. Requirements of the permit are broad and demand considerable funding to implement. Different components of the permit are implemented by different agencies necessitating negotiation and careful planning. DC WASA, DDOE and DC DPW signed a Memorandum of Understanding that defines and assigns responsibilities for compliance with the permit (December 2000).

In February 2007 DDOE was established as the new administrator of the District's Stormwater Program and is responsible for managing the District's MS4 NPDES permit. Prior to the expiration of the first permit, in 2007 EPA and DDOE agreed on a modification of the 2004 permit, which established increased detail and specificity about the activities that District would undertake to better manage stormwater pollution.

7.2.2.1 Existing Stormwater Regulations

In 1988 the District developed stormwater management regulations as part of the District of Columbia Water Pollution Control Act. Although the District is in the process of revising the stormwater regulations, current regulations provide that all development projects submitted to the DDOE Stormwater Management Division for approval must comply with the following minimum criteria (DCMR Title 21 Chapter 5):

- Submit management measures necessary to maintain the post-development peak discharges for a twenty-four hour, two- and fifteen-year frequency storm event at a level is equal to or less than the respective, twenty-four hour, two- and fifteen-year predevelopment peak discharge rate through stormwater management practices that control the volume, timing and rate of flows;
- Where a development is planned in which the stormwater runoff will increase the downstream discharge into an area designated as a flood hazard, as delineated on the *National Flood Insurance Flood hazard Boundary Maps* (FHBM), the developer shall complete an analysis of the downstream peak discharge for a one hundred (100) year frequency storm event, and shall install the appropriate controls to avoid exceeding this peak discharge;

- Where runoff is discharged into an off-site stormwater management facility, the applicant shall provide controls in accordance with those mandate by the District Department of the Environment (DDOE) in the *Stormwater Management Guidebook*
- Any stormwater discharge facility which may receive stormwater runoff from areas which may be potential sources of oil and grease contamination in concentrations exceeding ten (10) milligrams per liter (mg/l), shall include a baffle, skimmer, grease traps or other mechanism which prevents oils and grease from escaping the stormwater discharge facility in concentrations that would violate or contribute to the violation of applicable water quality standards in the receiving waters of the District;
- Any stormwater discharge facility which receives stormwater runoff from areas used to confine animals and which discharges directly into receiving waters shall be designed to prevent at least eighty-five percent (85%) of the organic animal wastes from escaping the stormwater discharge facility. The discharge from the facility shall not violate the water quality standards in the receiving waters of the District; and
- All stormwater management plans, shall conform to the District of Columbia's erosion and sediment control plans and flood management plans.

7.2.2.2 2004 MS4 NPDES Permit

Under the 2004 MS4 NPDES permit, there are no numeric effluent limits; however, there is a Maximum Extent Practicable (MEP) effluent limit where the District is required to "use implementation controls, Best Management Practices (BMP), and other activities necessary to reduce pollutants as set forth in the Upgraded Stormwater Management Plan dated October 19, 2002" (EPA 2004). The Upgraded Stormwater Management Plan was revised in 2009 and is discussed in Section 7.2.2.5. The current SWMP identifies how the District will implement the coming year's stormwater programs; it outlines goals and outcomes that DC plans to achieve and accomplish.

7.2.2.3 2007 Letter of Agreement

The original 2004 MS4 NPDES permit was challenged by environmental groups and DC WASA.

The District and EPA reached an agreement on a series of enhancements to the 2004 MS4 Permit. These enhancements were described in a November 27, 2007 Letter of Agreement, which was later amended on August 1, 2008.

The November 27, 2007 Agreement Letter provided a strategy and enhancements to upgrade the District's Storm Water Management Plan/MS4 Program. The Letter of Agreement defined a set of deliverables, commitments and deadlines to improve the management of stormwater and water quality. Commitments included activities such as (DDOE 2007):

- Draft a strategy and provide a detailed plan to achieve the optimal tree canopy in the District by 2009.
- Plant at least 4,150 trees per year with a goal of planting and maintaining 13,500 additional trees by 2014 and annually document the survival rate and estimate the storm capture rates.
- Complete a master LID implementation list by August 19, 2009.
- Construct 17 LID projects by August 2009.
- Complete the LID Stormwater Control Structures Maintenance Manual by April 30, 2009.
- Install approximately 50 rain gardens and 125 rain barrels city-wide and perform 200 downspout disconnections by December 31, 2009.
- Complete a structural assessment of District properties maintained by OPM to determine feasibility for green roof installation and submit an implementation schedule for green roof installation.
- Complete a street sweeping study and begin implementing long-term enhanced street sweeping and fine particle removal schedule and program by December 30, 2007.
- Install environmental catch basins or equivalent BMPs in new road reconstruction projects.

- Promulgate stormwater regulations that require LID construction as a first option.
- Revised and update the District Stormwater Management Guidebook by December 31, 2008.
- Commit $1 million annually for catch basin retrofits with vortex separator systems or other structural BMPs determined to be the best practicable technology to maximize stormwater pollution reduction.

A complete list of the requirements of the Letter of Agreement and progress to date are discussed in Section 7.2.3.

7.2.2.4 Draft 2010 MS4 Permit

EPA issues the District its MS4 Permits, as we are not a delegated jurisdiction. As the present time, EPA has not issued a final permit, and the previous 2004 permit remains in effect. DDOE is also guided by an Upgraded Stormwater Management Plan, February 2009, which outlines our current efforts. Because DDOE has seen only a draft permit dated April 2010, we are reluctant to outline/adopt commitments or permit terms. Instead, this WIP is intended to meet the spirit of the Draft 2010 permit over which DDOE and EPA have been negotiating. It also meets the spirit and letter of our current 2005 permit, the EPA-approved Upgraded Stormwater Management Plan of 2009, and the 2007 Letter of Agreement (containing significant stormwater enhancements). Based on the ongoing negotiations between EPA and DC, DDOE operates its stormwater programs with expanded terms and a new regulation in mind. We hope that a final (and accepted) permit will be formally issued by EPA by the time the Phase II WIP is under development, as that new Permit will significantly inform and impact the Phase II WIP.

EPA's Draft April 2010 Permit contains significant changes proposed to move the water quality improvement/protection efforts from planning stages into more practical and achievable implementation. One of the most significant changes is the move from requiring treatment or extended detention stormwater management controls to requiring the use of low-impact development (LID) or "green infrastructure" practices, such as green roofs, enhanced tree canopy, and bioretention and onsite water reuse. EPA is encouraging DC to maximize its use of innovative green infrastructure practices, and our WIP shows that we are headed in that direction with the use of incentive programs.

For the District of Columbia, compliance with best management practices (BMPs) contained in the Permit will constitute compliance with the DC Water Quality Standards (DCWQS), and this will contribute to meeting our allocations as determined by the Chesapeake Bay Phase 5.3 Model. Our regulation and the new Permit will likely require the design, construction and maintenance of stormwater controls to achieve retention of the volume generated on a site by a 1.2", 24- hour storm for all new development and redevelopment greater than 5,000 square feet in the District. The District may allow adjustments to retention standards to promote Smart Growth objectives such as high-density development, transit-oriented development and other development patterns in areas for which the District can quantify water quality, water quantity, climate change adaption or other environmental benefit(s). Any allowance for adjustments to the retention standard will be defined in the forthcoming Stormwater and Erosion Control regulations and shall include a minimum baseline on-site retention standard. There will be strict terms involved to document environmental benefits prior to allowing for any adjustments. We also plan to establish aggressive performance metrics for retrofit projects (such as counting square footage proportionate to the percentage of the retention standard achieved for projects that retain less than that standard, and counting for removal of impervious surface).

We plan to aggressively manage runoff from millions of square feet of impervious surfaces over the Permit Term, with approximately 1,500,000 square feet of impervious surface to be located in transportation rights-of-way. We will continue with our vigorous Tree Canopy goal, increasing the tree canopy coverage within the District from 35% to 40% over twenty five years. This will include strict new requirements for improved tree boxes, in the manner that will achieve optimal stormwater retention and tree survival rate. Another element calls for installing at least 350,000 square feet of green roofs over the Permit cycle on District properties during the term of the Permit (including schools and school administration buildings). We are working proactively with our District sister agencies to promote LID wherever structurally and fiscally feasible. To better track these efforts,

DDOE will document the square footage of green roof coverage in the District, whether publicly or privately owned, report any incentive programs implemented during the Permit term, and estimate the volume of stormwater that is being removed from the MS4 system (and combined system, as relevant) in a typical year of rainfall as a result of the combined total green roof facilities in the District.

The District agrees with EPA to require the use of green infrastructure and LID practices to reduce stormwater runoff from new development and redevelopment, to the maximum extent technically feasible. DC has plans for 1.2 million square feet (sf) of green roofs to be constructed by 2015, as follows:

- 450,000 sf on District Property
- 408,000 sf on Federal
- 430,000 sf on Private
- RiverSmart Green Roof subsidy program is:
  - $7 per square foot subsidy for large (> 4,000 sf) retrofit projects
  - $5 per square foot subsidy open to any applicant for new or retrofit, public or private
- Green roof locations throughout the District as of June 2010, current estimates put installations at 600,000 sf (200,000 sf were installed in 2009 alone). This is counted towards the 1.2 million sf by 2015 goal.
- Tree Canopy Goal: increase cover from 35% to 40% of city coverage by 2035

7.2.2.5 Upgraded SWMP 2009

The 2009 Upgraded Stormwater Management Plan (SWMP) is an updated version of the original (created by the District in 2002) to comply with the MS4 permit. An upgraded stormwater management plan is required six months before the current MS4 permit expires, as a requirement of the re-application process. The SWMP "outlines the District's strategy for implementing a more sustainable approach to manage the pollution carried by stormwater runoff into the District's waterways (DDOE 2009a). A primary focus of the sustainable strategy is green infrastructure (DDOE 2009a). The SWMP "contains specific and measurable outputs with deadline commitments throughout the duration of the next MS4 permit" (DDOE 2009a). While the DDOE is formally assigned as the 'Stormwater Administrator' the responsibility for implementing the MS4 Permit falls equally to other District Agencies and DC WASA, collectively known as the MS4 Technical Working Group, with coordination responsibilities falling to the DDOE Stormwater Management Division. The District agencies are DDOE, the District Department of Transportation (DDOT), the Department of Public Works (DPW), Department of Real Estate Services, Department of Parks and Recreation, Office of Public Education Facilities Modernization, and DC WASA. There is significant overlap between the implementation measures in the 2007 Letter of Agreement and the 2009 Upgraded SWMP. Table 12 lists all the implementation milestones established in the 2007 Letter of Agreement. Those projects that are also listed as measureable outputs in the 2009 Upgraded SWMP are denoted with a double asterisk (**).

The 2009 Upgraded Stormwater Management Plan identifies the regulatory authorities under which DDOE implements and enforces the requirements of the MS4 permit (DDOE 2009a)

> "DCMR Title 21, Chapter 15, provides extensive regulatory authority to control discharges to the wastewater system. Most importantly, the regulations provide that any sewers designated as storm sewers are included in the Wastewater System Control Regulations. §1502 requires each significant industrial user to apply for a permit, and §1503 through §1507 specifies the controls over the permittee. The District has sufficient authority under DCMR Title 21, Chapter 15, to prohibit discharges to the wastewater system. Under Chapter 15, the regulations provide that "it shall be unlawful to discharge into the wastewater system of the District except in accordance with this Chapter" (DCMR Title 21, Chapter 15 §1501.1). Chapter 15 expressly prohibits the discharge of certain materials listed in the Act, discharges of specifically listed chemicals, and it prohibits the discharge of wastes from garbage grinders, excepting those of ordinary household consumables (See DCMR Title 21, Chapter 15 §1501.2, §1501.4, and §1501.5). The regulations further require that all users of the

wastewater system pre-treat any discharges to the system as per the Chapter. The regulations are comprehensive in that they define the wastewater system as including any "sewers designated as storm sewers." Therefore, the regulations adequately provide authority to prohibit illicit dumping in both the wastewater system and storm sewers. They were enacted pursuant to legitimate statutory authority, D.C. Official Code §8-105.01 et seq., especially §8-105.06.

Authority to carry out all inspection surveillance and monitoring procedures necessary to determine compliance and noncompliance with permit conditions including the prohibition on illicit discharges to the municipal separate sewer system 40 CFR §122.26(d)(2)(i)(F)(1995).

The District has sufficient authority to carry out all necessary inspection, surveillance and monitoring procedures. D.C. Official Code §8-103.04 mandates that the Mayor "regularly monitor" District waters for compliance with water quality standards, while D.C. Official Code §8-103.06(b)(5) requires monitoring of discharge permits. The Mayor is authorized to "inspect and monitor facilities, discharges, activities, equipment, waters and other items pertinent to the regulation of the quality of the waters of the District" (D.C. Official Code §8-103.15(b)). The Mayor is also given authority to "enter upon or through any premises for purpose of inspection" to determine compliance with the Wastewater System Control Act, (D.C. Official Code §8-105.08). When water quality violations occur, DDOE can follow one of the following enforcement procedures to achieve compliance:

A. Take Informal Action - D.C. Official Code § 8-103.16 (b)
1. Directive
2. Cease and Desist Orders
3. Written Notice of Violation (Warning)
4. Administrative Orders (Notice of Noncompliance, Letters of Agreement, Consent Agreements)
B. Take Formal Action – can proceed judicially or administratively - D.C. Official Code § 8-103.16 -17
5. The Civil Infraction process - D.C. Official Code § 8-103.16(f)
6. Emergency/ Special Orders - D.C. Official Code § 8-103.17(b)
7. (C) Judicial Action- D.C. Official Code § 8-103.18(a)(2)
C. Refer case for Criminal Enforcement - D.C. Official Code § 8-103.16
D. Refer case to EPA"

The 2009 Upgraded Stormwater Management Plan also describes the process of inspecting MS4 outfalls for illicit discharges, as well as general piping conditions (DDOE 2009a).

"In FY 2008, the District began formal inspections of outfalls, with the goal of inspecting the entire system by the end of FY 2013. Outfalls were ranked as high, medium, or low priority based upon their proximity to industrial locations, size of their sewersheds, history of dry weather discharges, and chemical monitoring. There are currently 26 high priority outfalls, 120 medium priority outfalls, and 268 low priority outfalls. All high priority outfalls were inspected twice in FY 2009, and all medium priority outfalls will be inspected by the end of FY 2010. DDOE maintains a database of these outfalls, which contains an identification number for each outfall, geographic coordinates, pipe size, construction material, condition of the pipe and photos. DDOE uses the database to produce outfall inspection schedules. As inspectors conduct field inspections of the MS4 outfalls for illicit discharges, the database is updated to account for new field observations, such as conditions of the pipe and obstructions."

To improve the enforcement of environmental regulations in the District, DDOE developed a comprehensive environmental enforcement system and implemented a tracking database for District inspectors, allowing inspection information and enforcement actions from different divisions to be shared (DDOE 2009a). This includes inspections of permanent source controls or BMPs. Maintenance schedules and BMP agreements are required to be included in the stormwater management plan submitted to obtain approval to begin construction (DDOE 2009a). DDOE inspectors perform maintenance inspections regularly.

7.2.2.6 Revisions to the Stormwater Management and Erosion and Sediment Control Regulations

The District's stormwater management and erosion and sediment control regulations are under revision. The District expects that the final regulations will be consistent with the USEPA-issued Municipal Separate Storm Sewer System (MS4) permit for the District, which is also currently under revision. The draft version of the District's new MS4 permit includes a requirement for development sites disturbing 5,000 sf or more of soil to retain the runoff from a 1.2" storm.

In the Anacostia waterfront area, as consistent with the District's Anacostia Waterfront Environmental Standards Act of 2008, the District's regulations would also require treatment of the run-off volume from up to a 3.2" storm (e.g. to remove 85% of total suspended solids). The Anacostia waterfront requirements would become effective for publicly owned or publicly funded projects beginning on the effective date of the regulations.

The District is also currently revising its *Stormwater Management Guidebook* to provide updated guidance and specifications for complying with the new stormwater management requirements.

7.2.2.7 Programs to Reduce Nonpoint Source Pollution in the MS4 and Other Areas

DC Green Building Act

The DC Green Building Act (D.C. Official Code § 6-1451.01 *et seq.*) took effect on March 8, 2007. It requires all District public buildings to meet the U.S. Green Building Council's LEED certification standards for environmental performance. Privately constructed buildings must meet LEED standards by 2012. The Act also requires green building practices be incorporated into the District's Construction Code. The construction code is reviewed triennially and is currently under review (DDOE 2009a). The Green Building Act made the District the first city in the U.S. to require new privately constructed buildings to meet LEED standards. Over 175 building in the District are LEED registered.

Tree Planting

The DDOT Urban Forestry Administration (UFA) coordinates planting street trees throughout District rights of way (DDOE 2009a). UFA plants and maintains District's street trees. Street trees are those located between the sidewalk and the curb, in the right-of-way.. The UFA plants about 3,400 street trees in the District annually (DDOE 2010d). The number of trees planted by the UFA is the majority of the annual tree planting goal stated in both the MS4 Letter Agreement and the 2 Year Milestones. The UFA uses a GIS-based system, CityWorks, to manage the street tree network (DDOE 2009a). UFA and four state partners have been awarded federal grant money for the development of a strategy for achieving optimal tree canopy. This project, supported by USDA Forest Service, Northeastern Area State and Private Forestry, will allow UFA to make the most of the District's limited public planting space and prioritize planting locations (DDOE 2010d).

Recent UFA accomplishments include hiring an Urban Forester/Landscape Architect in FY08 to identify opportunities to minimize stormwater runoff by maximizing tree space size and pervious hardscape surfaces, to recommend appropriate tree planting techniques, and to ensure tree survivability by reviewing site plans (DDOE 2009a).

RiverSmart Homes

RiverSmart Homes is an incentive-based program "designed to encourage residential property owners to adopt stormwater management practices that will reduce non-point source pollution from their properties" (DDOE 2009a). Homeowners can receive up to $1,200 to install landscape enhancements. Homeowners can select from one or more of the following options: shade trees, rain barrels, pervious pavers, rain gardens, and BayScaping. The program began in 2008 as a pilot project in the Pope Branch subwatershed of the Anacostia River. It has since been expanded to the entire District. (DDOE 2009b) To date 1,214 audits have been completed, 725 rain barrels have been installed, 266 trees have been planted, 82 rain gardens have been installed, 25 pervious paver projects and 142 BayScaping installations have been planted. More than 2,000 homeowners are interested in the in the RiverSmart Homes Program and are on a waiting list to have an audit performed for their property. DDOE expects the program to grow as homeowners become aware of the impervious area stormwater management fee, which is discussed in detail in Section 7.2.6.

DDOE intends to expand the program to include a web-based tool to educate homeowners about stormwater pollution on the property and provide follow-up information for homeowners already participating in the program. The follow-up information will provide guidance on proper care and maintenance for their landscaping enhancements and will encourage them to install additional BMPs on their property (DDOE 2009b).

RiverSmart Rooftops

RiverSmart Rooftops is an incentive program through the DDOE to help reduce stormwater runoff by providing subsidies to property owners who install a green roof. For projects up to 4,000 square feet of vegetated surface, there is a rebate of $5 per square foot, with each property being eligible for up to $20,000. These projects can be installed on new or existing properties. For projects over 4,000 square feet of vegetated surface, there is a rebate of $7; however, only existing properties are eligible. An analysis of green roof performance indicates that green roofs can retain 50-75 percent of the total rainfall over a year (Johnson 2008). In the District, this translates to 15 gallons of stormwater per square foot of green roof coverage or 630,000 gallons per acre (Johnson 2008).

Green roofs that are a part of new construction in the District are tracked in DDOE's Plan Review Database. Green roofs that are installed as a retrofit are tracked by participation in the RiverSmart Rooftops incentive program and by installations by municipal partners. Eleven green roofs totaling 287,491 square feet were approved in FY08 and thirteen green roof projects for a total of 101,766 square feet were approved in FY09. These projects will bring the District's total square footage of green roofs to 720,735 square feet. Nineteen of these projects are in the CSO portion of the city, while 5 of them are in the MS4 portion (DDOE 2010c). Commitments are in place to raise the green roof coverage in the District to 1.3 million square feet in 2012. In 2009 Green Roofs for Healthy Cities awarded the District second place (behind Chicago) for most installations in 2009.

Street Sweeping

The District Department of Public Works manages a street sweeping program. Street sweeping plays an important role in the District's attempts to reduce street nonpoint source pollution. Street sweeping can improve water quality by reducing the amount of sediment entering the storm drain system, thereby reducing the need for stormwater treatment practices. Debris collected through the street sweeping program is disposed as solid waste. DPW performs street sweeping with mechanical sweepers to clean streets and paved alleys and manual sweeping in other areas. The mechanical sweeping program is conducted in the spring, summer and fall throughout densely populated residential neighborhoods with high-volume pedestrian traffic (DDOE 2009a).

DPW completed the Phase 1 of the *Enhanced Street Sweeping and Fine Particle Removal Strategy* in FY 2008. Phase I was conducted to determine the effectiveness of DPW's mechanical sweeping program with regard to removing fine particulate matter from the roadways in the MS4 area. This sampling study analyzed both the

composition of materials collected during the sweeping process, as well as the fine particulate matter that remains on the street. It also began a comprehensive review of the DPW street sweeping program, and developed a tentative street classification and sweeping frequency to enhance the District's sweeping program for fine particle removal. Table 11summarizes the tentative area/street classifications and estimated sweeping frequencies outlined in this study.

In FY 2009, DPW continued Phase II of the street sweeping study, to develop newly designed routes for the signed sweeping areas that accounted for drivability and provided an optimal travel path. Phase II also consisted of developing sweeping regions for unsigned streets that were designated by the District as "environmental hotspots" (DDOE 2010c). DPW now requires the recommendation from Phase II to be implemented.

The success of DPW's street sweeping efforts will be measured by an increase in tons collected as a result of street cleaning activities. Street sweepers with the License Plate Recognition System (LPRS) installed will be monitored to determine increases/decreases in compliance with No Parking signs in areas signed for mechanical street sweeping.

Table 11. FY 2009 DPW Street Sweeping Study Tentative Area/Street Classifications and Sweeping Frequencies (DDOE 2010c)

Tentative Area/Street Classification	Estimated Minimum Frequency	Estimated Maximum Frequency
Arterials – heavily developed commercial and central business districts with considerable vehicular and pedestrian traffic	9 times per year	16 times per year
Industrial	6 times per year	9 times per year
Residential - residential areas with limited throughway and pedestrian traffic AND neighborhood streets which are used for local purposes only	4 times per year	9 times per year
Central Business District / Commercial – neighborhood business districts and main streets with moderate vehicular traffic	Biweekly	Twice per week
*Tentative classifications and estimated frequencies. Final classifications and frequencies to be determined as part of Phase II of the sweeping study		

Catch Basin Cleaning, Replacement and Retrofits

By trapping coarse sediment and trash and debris, stormwater catch basins help prevent these solids from being washed into local waterways. However, catch basins must be cleaned periodically if they are to maintain their solids-trapping functionality. The DC WASA is responsible for catch basin maintenance in the District. District catch basin maintenance increased between the mid-nineties and the year 2000. The number of catch basins cleaned and repaired has remained relatively constant since 2000.

There are approximately 24,000 catch basins within the public rights-of-way in the District, about half of these are in the MS4 area (DDOE 2009a). DC WASA is responsible for the maintenance of all those located in the MS4 and CSO areas of the District (DDOE 2009a). When a roadway undergoes total reconstruction, the catch basins are replaced with water quality or environmental catch basins that remove more pollutants than a conventional catch basin (DDOE 2009a). Additionally, all catch basins are cleaned on an annual basis, with additional cleaning by customer request (DDOE 2009a). All catch basin locations have been geo inventoried and added to a GIS dataset. DDOE uses this information to track and organize volunteer storm drain stenciling activities, which are conducted on a subwatershed basis (DDOE 2009a). DDOE is also working to improve catch basin water quality performance by retrofitting catch basins with filters, sponge inserts and trash screens (DDOE 2009a).

7.2.3 Current Progress on Planned Implementation Activities and Implementation Schedule

As discussed above, numerous implementation projects were outlined in the 2007 Letter of Agreement between the District and EPA. Table 12 summarizes the progress that has been made to date. Those projects that are also listed as measureable outputs in the 2009 Upgraded SWMP are denoted with a double asterisk (**). Some of these activities overlap with the District's 2009-2011 Milestones for Reducing Nutrients and Sediment to the Chesapeake Bay, which are discussed in Section 7.2.4.

Table 12. Progress on the 2007 Letter of Agreement Implementation Milestones

Type of Milestone	Milestone	Status	Notes
Administrative	Update 2000 MOU to define roles and responsibilities for each District Agency	Completed	
	Convene a Stormwater Management Task Force	Completed	
	Implement recommendations for funding mechanisms and fee structure	Completed	
Tree Canopy	**Draft strategy to achieve optimal tree canopy with input from stakeholders	In Progress	Current tree canopy is 35%; Tree canopy goal is 40%
	**Provide final plan for achieving optimal tree canopy goal	In Progress	Draft strategy finalized in June 2010, awaiting stakeholder comments
	**Make best efforts to achieve optimal tree canopy by planting at least 4,150 trees/yr, with a goal of 13,500 by 2014 and document the survival rate and storm capture rates	In Progress	4,150 trees are planted annually, DDOE purchased software to calculate stormwater volume remove from MS4
	Develop and implement a schedule to achieve an optimal tree canopy goal and implement schedule by 2014.	In Progress	Timeframe for achieving goal is 2035. Draft strategy addresses schedule and number of annual tree plantings
	**Continue current tree planting at the rate of at least 4,150 trees/yr	On Track	More than 6,000 trees were planted by UFA and environmental groups in 2009
Low Impact Development	**Complete master LID implementation list	Completed	Included in 2009 SWMP
	Construct 17 LID projects by August 2009	Partially Completed	See Table 13 below
	**Complete LID Stormwater Control Structures Maintenance Manual	Completed	Finalized in May 2009
	**To the extent feasible, DDOT will comply with all LID options in the Anacostia Waterfront Initiative Transportation Architecture Design Standards for all DDOT transportation infrastructure projects	On-going	
	Include the revision to the DC MS4 permit in Appendix C to the 2005 Anacostia TMDL Implementation Plan	Completed	
	**City Hall shall make best efforts to devise an LID plan and schedule to be completed no later than December 31, 2014	On Track	
	**LID Plan should extend LID incentives to strategies and to areas other than pocket parks	On Track	Plan will include River Smart Homes program and the green roof incentives program
Rain Gardens	**Install approximately 50 rain gardens and 125 rain barrels city-wide and perform 200 downspout disconnections by December 31, 2009	Completed	14 rain rain gardens, 13 permeable pavement, 59 bayscaping, 400 rain barrels installed by December 31, 2009; Additional 39 rain gardens, 25 bayscaping and 3 permeable pavement projects installed by June 2010.
Green Roofs	**Work with the Mayor's office to determine the best way to develop legislation to establish tax credits or other incentives for installation of green roofs on non-governmental buildings	Completed	DDOE established a green roofs incentive program funded through the MS4, stimulus funds and 319 grants. $5/sq ft subsidy for projects up to 4,000 sq ft and $7/sq ft for projects over 4,000 sq ft
	**Complete structural assessment of District-owned properties maintained by the Office of Property Management to determine roof conditions and feasibility for green roof installation	Completed	

Type of Milestone	Milestone	Status	Notes
	**For the next four years every new building constructed by OPM will include green roofs where feasible and all major renovations/rehabilitations will receive green roofs where feasible	On-going	
	Submit implementation schedule for green roofs to be installed on District properties based on results of structural assessment	On-going	Schedule contains list of potential properties
	Continue to review new and retrofit construction for green roof installation throughout the District, making $500,000 in incentives available	On-going	DDOE has made available $500,000 for residential, commercial and District controlled properties since October 1, 2008.
	After 1 year assess the effectiveness of green roof incentives, including dedicating up to $1,000,000/yr	Completed	DDOE dedicated over $1,000,000 per year for green roof construction for the past 2 years. Program is being assessed.
	**Annually document and report the square footage of green rood coverage for all buildings in the District	Completed	DDOE compiled a green roof database. Annual MS4 reports contain the square footage of the projects.
Street Sweeping	Complete street sweeping study and begin implementation of long-term enhanced street sweeping and fine particle removal	Completed	Street Sweeping Study completed in 2007 Enhanced Street Sweeping and Fine Particle Removal Strategy completed in 2008 DDOE will sign an MOU with DPW in FY2010 to provide funding from the Stormwater Enterprise Fund to help implement findings
	Submit the details of implementation of enhanced program for street sweeping and fine particle removal in the Upgraded SWMP	Completed	Street Sweeping implementation schedule was incorporated into the District 2010 draft MS4 permit and will be a component of the Trash TMDL Implementation Plan
	Continue implementation of large and enhanced fine particle removal program	Completed	DPW implements sweeping program based on recommendations from the studies. Since FY 2009 DPW tracks tonnage collected in mechanical sweeping, alley cleaning, manual cleaning, litter cans and carts. Data is included in MS4 Annual Report
	Incorporate street sweeping plan and schedule in next MS4 permit	Completed	Incorporated into 2010 Draft Permit
Estimation of Pollutant Reductions from BMPs	Develop a statistical model for estimating pollutant reductions. Include draft in 2008 MS4 Annual Report and final in upgraded SWMP	Completed	Draft model developed in Excel was included in 2008 MS4 Annual Report. Model is based on EPA's Watershed Treatment Model and Portland Model. Not finalized because WTM underwent revisions
Implementation of Program to Control Discharges from District and Federal Facilities	**Develop a pollution prevention program to include training to District employees in charge of maintenance facilities and who handle hazardous materials	Completed	District's Stormwater Pollution Prevention Plan Guidance was completed in 2009 and distributed to each agency and DC WASA. DDOE provided 5 training classes in 2009 and 2010. Routine customized trainings will be held throughout the year.
Update Stormwater Regulations and Guidelines to incorporate enhance management methods	Promulgate new stormwater regulations that will require LID construction as a first option, and will incorporate enhanced stormwater management requirements for the District by June 2008	In Progress	Public outreach meeting were held in June and July 2009 to consider implementation strategies and seek input on soil erosion and sedimentation control and stormwater management regulations.
	Promulgate new regulations that require construction site managers to have erosion control training by June 30, 2008	In Progress	Requirement will be incorporated in the final stormwater management regulations when they are finalized
	Revised and update District Stormwater Management Guidebook by December 31, 2008	In Progress	Guidebook will be completed once the revised stormwater regulations are in effect.

Type of Milestone	Milestone	Status	Notes
Review Construction Projects	Continue to review construction projects in the District for soil erosion, sedimentation control and stormwater management. Once promulgated require compliance with the AWC standards where feasible	On-going	District continues to review projects
	Provide the number of LID projects installed in private properties	On-going	The number of LID projects installed is reported annually in the MS4 annual reports.
Trash Removal Plan	Continue with current and new trash removal programs	On Track	Develop Trash TMDL; Working with DPW to increase the amount of time spent on sweeping environmental hotspots
	**Require water quality catch basins for trash/sediment removal devices for new roadway reconstruction projects	On-going	
	Complete a trash survey and removal strategy	Completed	Anacostia Watershed Trash Reduction Plan was completed in December 2008
	**Determine type of trash control devices that are most effective in retaining large debris and sediments in hot spot areas	On Track	DDOE is conducting field surveys within the Anacostia Watershed to determine suitable and effective trash controls.
	**Identify suitable location of one end-of-pipe little trap and install	Completed	In November 2008 Nash Run and Watts Branch were selected to test end-of-pipe technologies (instream trash traps and floating litter traps)
	**Retrofit 50 catch basins to address trash control in conjunction with enhancements to street sweeping efforts	Completed	50 catch basin inlet screens were installed in Fort Dupont subwatershed in 2009. An additional 30 will eventually be added.
	**Develop Anacostia Trash TMDL Implementation Plan by October 31, 2010	On Track	
Retrofit Catch Basins	**Commit $1 million annually for retrofitting catch basins with vortex separator systems or other structural BMPs determined to be best practicable technology to maximize stormwater pollution reduction, beginning in October 2009	Completed	
Pet Waste	Provide implementation plan and strategy to reduce pet waste from entering storm drains	Completed	Pet Waste Strategy was included in the 2009 upgraded SWMP.
Illegal Dumping	Submit the number of catch basins and structural components of the MS4 conveyance system to be retrofitted as part of Watts Branch Restoration	Completed	Two sewer crossings are repaired, remaining sewer line repair work will be completed in early 2011.
	Begin Watts Branch project: stream restoration, catch basin retrofits, storm drain stenciling	In Progress	Storm drain stenciling began in April 2008. Pre-solicitation notices have been issued for bids on the stream restoration work
	Establish an Enforcement Office to advance and standardize enforcement procedures in DDOE	Completed	Office of Enforcement and Environmental Justice was established
	Continue to enhance DPW illegal dumping programs	Completed	Solid Waste Education and Enforcement Program (SWEEP) inspectors patrol area for sanitation violations. District residents can report dumping to the city call center
	**Work with Metropolitan Police Department to enhance illegal dumping enforcement	In Progress	DPW in partnership with the Metropolitan Police Department offers rewards up to $500 for information leading to the arrest and conviction of each illegal dumper.
	**Work with DPW to install cameras to record illegal dumping and assist with enforcement	In Progress	Washington Parks and People was selected as a grant partner and are finalizing the grant agreement. Work will begin in late 2010.
Illicit Discharge Program	Continue to enhance the illicit discharge program by targeting potential discharge sources	In Progress	Illicit Discharge Detection and Elimination (IDDE) strategy was developed in 2008
	City Hall shall complete a strategy for proactive inspection and enforcement of illicit discharges of pollutants to storm sewers and drains.	Completed	IDDE strategy was submitted to EPA and targets sanitary wastewater, auto repair, car wash, Laundromats, household hazardous wastes, grass clippings, leaf litter, floatables and animal waste

Type of Milestone	Milestone	Status	Notes
	Annually target 20 percent of the MS4 area to achieve 100 percent coverage in the permitting cycle	On-going	District is meeting 20% target to achieve 100% coverage in the permitting cycle.
Install Storm Drain Markers	Install 1,000 storm drain markers per year starting in April 2008	On-going	At least 1,000 are installed annually
Promote proper pet waste disposal	Distribute scoop your poop educational materials to all veterinarian clinics and pet shops in the District by March 2008	Completed	Flyers were distributed to all areas, including the CSO area.
Publicize illicit discharge program elements	Increase publicity of the need to prevent illicit discharges	Completed	Enhancements were identified in the upgraded 2009 SWMP

As part of the 2007 Letter of Agreement 17 LID projects were to be constructed in the MS4 area by August 19, 2009. Only nine were completed and another three are in the design phase; these are summarized in Table 13.

Table 13. LID Project undertaken as part of the 2007 Letter of Agreement.

Project	Type of LID	Location	Year Built
Anacostia River Walk Trail #1	Street Tree buffer area	11th St. at M St. SE & N St. SE	2008
Anacostia River Walk Trail #2	Vegetated Swale	Water St. SE west of boat houses in wooded area	2008
Anacostia River Walk Trail #3	Bioretention Area	Water St. SE near boat houses	2008
Anacostia River Walk Trail #3a	Vegetated Swale	Water St. SE near boat houses	2008
Anacostia River Walk Trail #4	Bioretention Area	M St. SE & Water ST. SE intersection	2008
Anacostia River Walk Trail #5	Bioretention Area	Near RFK Stadium service road & Independence Ave connector	2008
Anacostia River Walk Trail #6	Bioretention Area	Off Benning Rd., between Oklahoma Ave & RFK parking lot entrance	2008
East Beach Dr. NW.	Bioswales (2)	1000 LF roadway runoff directed through curb cuts to roadside ROW w/ rip rap; western side	2008
Nebraska Avenue	Bioswales (2)	Nebraska Avenue	2008
Nannie Helen Burroughs Avenue	Bioretention (2)	Along Nannie Helen Burroughs Avenue (NHB)	In Design
Nannie Helen Burroughs Avenue	Bioswale	Along NHB	In design
Nannie Helen Burroughs Avenue	Bioretention planters (12)	Along NHB	In design

7.2.4 2009 to 2011 Chesapeake Bay Milestones

The first 2-Year Chesapeake Bay TMDL Milestone period (2009-2011) is already underway. The District committed to 13 milestones for the first 2-Year Period in the Chesapeake Bay TMDL Milestone period, as required by the President's *Executive Order 13508: Chesapeake Bay Protection and Restoration*. These milestone activities and the progress to date are detailed below. As discussed in previous sections, there is a large overlap between the implementation commitments in the 2007 Letter of Agreement, the 2009 SWMP and these 2009-2011 Milestones.

Expand Urban Tree Canopy

1. Plant 4150 trees (30 acres) per year
- DDOT planted this many trees in 2009 in all areas of the City, which helps to increase urban tree canopy coverage by 5 percent (from 35 percent to 40 percent) in 25 years. For 2010 we are committed and positioned to plant 4,150 throughout the city by the end of the calendar year.

2. Increase urban tree canopy coverage by 5 percent (from 35% to 40%) in 25 years
- DDOE coordinated the partnership of District Agencies and NGOs charged with setting an Urban Tree Canopy goal for the District. DDOE is in the process of developing a plan to achieve the 40 percent canopy goal. We have taken this lead because of the commitments in our MS4 permit and the new TMDL requirements. Although DDOE is leading this issue, DDOE does not own any land in the District. DDOE has taken the lead of putting together a Tree Canopy Plan, but we have no authority to require other District agencies to plant or maintain their trees. Furthermore, 1/3 of District land is federally held; and getting the federal government to adopt District initiatives remains difficult.

3. Create new tree box standards to allow for better tree growth
- A draft plan for new tree box standards has been circulated to the District's major tree planting agencies and they have provided comments. DDOE is working on a second draft that will be circulated widely. Once we have buy-in across the District we will be working to promulgate new standards.

Low-Impact Development (LID) Practices

4. Install approximately 100 rain gardens and 250 rain barrels
- DDOE has installed 82 rain gardens and over 700 rain barrels on residential properties in all 8 Wards; this is part of the RiverSmart Homes Program.

5. Perform 300 downspout connections
- We have performed 700 downspout disconnections, mostly in conjunction with overall RiverSmart Homes activities (including rain barrels and rain gardens).

6. Develop lot-level residential stormwater detention/retention through RiverSmart Homes incentive program
- More than 1000 homes have been audited for the RiverSmart Homes Program; more than 2,000 D.C. homeowners are on the waiting list to have an audit performed.
- As part of the RiverSmart Homes Program: 266 trees have been planted, 142 BayScaping projects have been installed and 25 pervious paver projects have been installed to date.

7. Incorporate LID into 24 percent of all District DOT projects
- Between January 2009 and November 2010 30% of DDOT projects incorporated LID practices.

8. Train federal facilities on new stormwater requirements
- In 2009 DDOE initiated and held a full day workshop with 5 federal agencies to explore creative ways to implement the Energy Independence and Security Act (EISA), which has strong implications for how federal facilities implement their stormwater controls on their properties within the District and throughout the Bay watershed. DDOE continues to coordinate closely with these agencies to continue developing stormwater controls on all new federal facilities, in accordance with EISA.

Build Green Roofs

9. Convert 2.5* million square feet to green roofs each year
- Current estimates put installations of green roofs in the District at 600,000 square feet, 200,000 square feet were installed in 2009 alone.

- *Unfortunately, the number for this 2 year milestone was miscalculated and this goal will not be met at the end of 2011. However, we anticipate meeting this goal by 2017. This goal coincides with the outgoing Mayor's goal to have 20% green roof coverage within 20 years (of his taking office in 2007).

Stormwater Practices and Pollution Prevention

10. Implement a program to control discharges from District and federally owned facilities
- DDOE is using its current MS4 (stormwater) Permit, its accompanying Upgraded Stormwater Management Plan, February 2009; along with its Erosion Control & Stormwater Regulations as a framework to manage discharges from both District and federal facilities. Federal facilities are not legally 'required' to comply with District laws, but EPA has provided guidance related to the Energy Independence & Security Act (§438) as a helpful way to promote adopting LID on federal facilities. For the District, our EPA-issued MS4 Permit is the regulating authority for District agencies, together with stringent Stormwater Pollution Prevention Plans in place for each agency.

11. Strengthen auto repair shop education campaign in Hickey Run (pilot)
- In terms of the Hickey Run pilot program, education is part and parcel of our inspections, and we spend a good deal of time speaking with the business owners and informing them of proper best management practices. DDOE inspects roughly 14 facilities per month, and 14 outfalls per month in addition to complaints or discharges of which we are made aware.

12. Inspect all auto repair shops, laundromats and dry cleaners at least once every five years
- Beginning in FY 2009 to date, we have conducted 266 facility inspections including: 179 automotive facilities, 74 dry cleaners/laundromats, and 13 car washes. In addition to these inspections, brochures and wall postings have been developed and are currently accessible through green.dc.gov.

13. Develop and implement a pet waste strategy
- DDOE developed an aggressive Pet Waste Strategy in 2009 and will continue marketing it in 2011 with schools, parks, other District agencies (DOH), and riparian communities – this will help to reduce bacteria loadings into the waterways from land runoff.

14. Mandate installation and use of pumpout stations at all District marinas
- All new and redeveloped marinas in the Anacostia Waterfront area are required to have pumpout stations and to be certified as 'Clean Marinas.' This is in accordance with Sec. 457 of the "National Capital Revitalization Corporation and Anacostia Waterfront Corporation Reorganization Act of 2008" (Marina standards) – *"New or existing marinas within the Anacostia Waterfront Development Zone shall comply with the program elements outlined in the Clean Marina Guidebook issued by the National Park Service. The owner or applicant for the marina shall submit a copy of its Clean Marina Checklist and any supporting documentation to the DDOE."*

15. Restore 2.7 miles of Watts and Pope Branches
- Designs for Pope Branch were completed in October of 2010. Construction will begin in early 2011.
- Watts Branch designs were completed in September of 2010. Construction will begin Jan. 2011 and last for approx. 9 months.

16. Replace/eliminate 1.5 miles of sewer lines in Watts and Pope Branch
- The sewer line replacement in Watts has begun and will continue into 2011. The sewer line work in Pope will be done concurrently with the stream restoration (early 2011).

17. Complete a DPW street sweeping study and implement long-term enhanced street sweeping and fine particle removal

- DPW completed the enhanced street sweeping study in 2010 and began planning activities to implement enhanced street sweeping in 2011. Beginning March 2011, DPW will be conducting weekly sweeping of environmental hotspots in the Anacostia watershed of the District. These hotspots were identified as part of the development of the 2010 DC Trash TMDL. Sweeping will take place from March through October annually. DPW and DDOE are collaborating on identifying other environmental hotspots throughout the rest of the District that can be addressed with enhanced sweeping.

18. Implement and promote new stormwater regulations that require LID construction as a first option and mandate training for site managers
- DDOE plans to finalize it draft stormwater regulations internally in the next couple of months. The regulations will include a 1.2 inch retention standard for new and redevelopment in line with USEPA's draft MS4 permit to the District. However, the ability to do off-site mitigation for a portion of the retention amount will be allowed. DDOE is exploring the option of establishing a stormwater retention credit market as an option to help developers meet their stormwater requirements. The details of the new retention requirements and the mitigation program would be worked out in a revised stormwater guidebook that will be released soon after the regulations.

19. Implement an impervious area-based stormwater fee
- DDOE worked with other agencies and Council to implement an impervious area-based stormwater fee, which helps to reduce polluted stormwater runoff. Complete as of May 2009.

20. Review and update zoning regulations to encourage green building
- The District Office of Planning has recommended changes to its zoning code to increase considerations of climate change; energy conservation and renewable energy production; integrating land use and mobility; water conservation and greywater; slopes, streams, stormwater and hydrology; food production/security and community health; and sustainable business and green jobs. Draft text is currently being brought before the Zoning Commission on a sustainable sites requirement called the Green Area Ratio which is intended to implement many of these objectives by implementing LID, renewable energy, and other sustainability measures. In addition, other language encouraging sustainable development through zoning regulations will be brought forward for approval during the coming year.

Point Source Pollution Reduction Actions by 2011

- The schedules for point source reductions at Blue Plains concerning ENR and the LTCP have not changed

Trash TMDL and Trash Removal

The District is developing a Trash TMDL implementation Plan for the Anacostia River by 2010

- The Anacostia Trash TMDL was approved by the EPA on September 21, 2010

21. Retrofit 100 catch basins for trash control in conjunction with enhancements to the District's street sweeping efforts.
- DDOE plan review teams have these catch basins installed on major roadway reconstruction projects. This past year approximately 60 water quality catch basins where installed as part of Watts Branch Bridge reconstruction project. In addition, DDOE has retrofitted 50 catch basins in the Fort Dupont watershed with catch basin inlet screens. These inlet screens are designed to prevent trash from entering the catch basin.

22. Install 1,000 storm drain markers annually.
- Completed in 2009 and 2010, on track for 2011

23. Install litter trap demonstration projects to divert 6,800 pounds of trash by 2011.

- To date DDOE has installed two in-stream trash traps and has collected 6,585 lbs of trash. The trash traps where installed on Nash Run and Watts Branch, both tributaries to the Anacostia.

24. Determine the type of trash control devices that would be the most effective in retaining large debris and sediment in hot-spot areas identified by a trash survey.
DDOE has a contract with the Earth Conservation Core and Howard University to test several kinds of trash abatement devices including catch basin inlet screens and in-stream trash traps. This research is focused on testing the cost effectiveness of various trash control devices with the goal of helping the District Understand what would be the best way to allocate resources for trash abatement activities that are undertaken as part of the compliance with the new Trash TMDL.

7.2.5 Anticipated BMP Implementation in the MS4 Area 2010-2025

Implementation of many best management practices is expected to continue at a constant rate between 2010 and 2025. Reductions from the MS4 area were calculated as the sum reductions from existing BMPs plus the estimated reductions from additional BMP implementation, as identified in Table 14.

Table 14. Existing and Future BMP Implementation Activities in the MS4 area

Existing BMPs 2009 and earlier	BMP Implementation 2010-2025
Wetponds and wetlands	½ mile of stream restoration annually (District-wide)
Dry detention ponds and hydrodynamic structures	8,600 trees planted annually (District-wide)
Infiltration practices	Street sweeping on 641 acres outside of CSO area
Filtering practices	1.2" 24- hour storm Retention Standard for all new development and redevelopment greater than 5,000 square feet (applicable once the new MS4 permit is issued)
	Erosion and Sediment Control for all land disturbances over 50 sq. feet.

Table 15 summarizes the estimated annual load reduction from these BMPs. The annual rates are based the Chesapeake Bay Watershed Model Scenario Builder outputs for the District of Columbia assuming the implementation of the 1.2" retention standard discussed in Section 7.2.2.4.

Table 15. Summary of expected annual load reduction from the MS4 area.

Total nitrogen (lb/yr)	Total Phosphorus (lb/yr)	TSED (lb/yr)
13,659	4,545	2,262,363

The MS4 nutrient and sediment allocations are based on the nutrient and sediment load reductions achievable, as determined by the Chesapeake Bay Model Phase 5.3, based on the implementation activities, as discussed above.

Table 16 summarizes the anticipated reduced loads as a result of BMP implementation and Figure 14 through Figure 16 illustrate the load reductions. The MS4 allocations require an 11 percent reduction in total nitrogen, a 27 percent reduction in the total phosphorus and 26 percent reduction in total sediment.

Table 16. Anticipated Loads from the MS4 as a result of implementation activities

Year		Total Nitrogen (lb/yr)	Total Phosphorus (lb/yr)	Sediment (lb/yr)
2009	ANATF_DC	47,130	8,958	2,429,170
	ANATF_MD	12,617	2,549	572,918
	POTTF_DC	42,011	3,736	4,904,197
	POTTF_MD	18,288	753	560,577
Total		120,047	15,997	8,466,863
2017	ANATF_DC	44,324	7,728	2,055,820
	ANATF_MD	11,520	1,996	443,670
	POTTF_DC	40,719	3,355	4,374,022
	POTTF_MD	16,654	645	462,170
Total		113,217	13,724	7,335,681
2025	ANATF_DC	41,517	6,498	1,682,470
	ANATF_MD	10,424	1,444	314,421
	POTTF_DC	39,427	2,975	3,843,847
	POTTF_MD	15,019	536	363,762
Total		106,388	11,452	6,204,500
Allocation		106,388	11,452	6,204,500

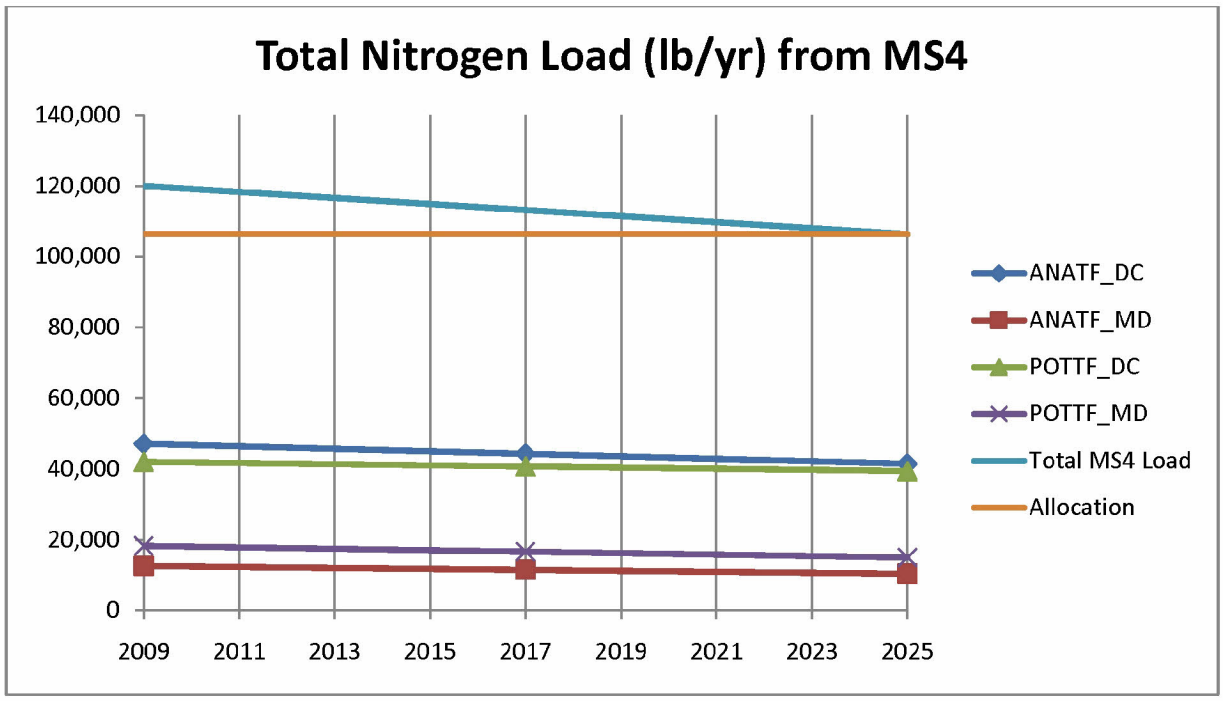

Figure 14. MS4 Total Nitrogen Loads and Allocation

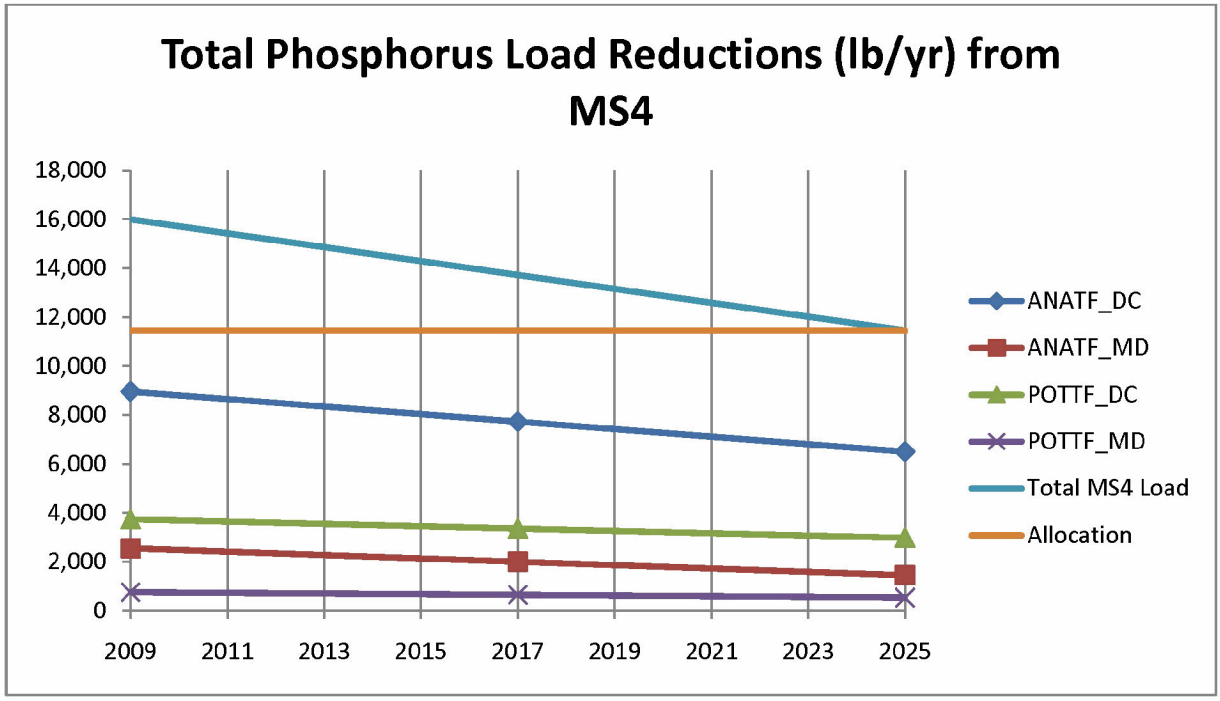

Figure 15. MS4 Total Phosphorus Reductions and Allocation

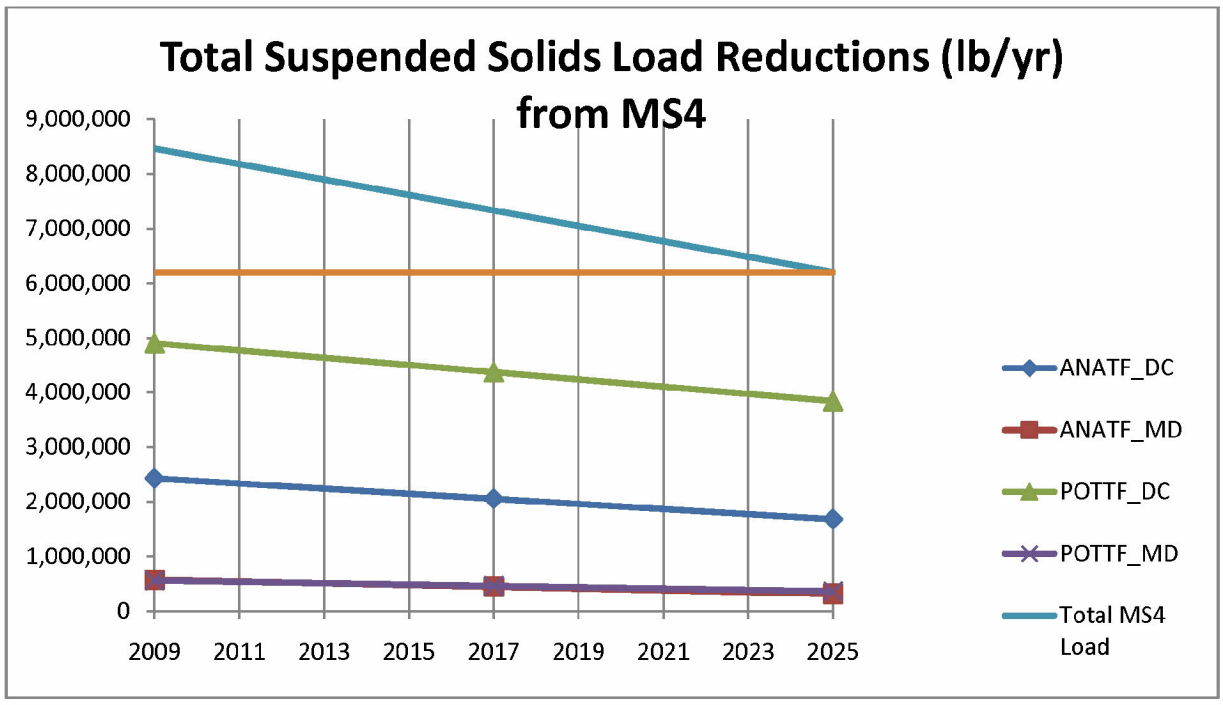

Figure 16. MS4 Total Suspended Solids Reductions and Allocation

7.2.6 Funding Capacity

In order to fund activities associated with managing stormwater pollution, as required by the MS4 permit, DDOE revised its stormwater fee, effective May 1, 2009 (DDOE 2010b). The revised fee is $2.67 per 1,000 square feet of impervious surface. This fee is separate and in addition to the Impervious Area Charge levied by DC WASA for implementation of the LTCP. Both fees are charged on the DC Water bill.

In addition to funding from the stormwater management fee (the Enterprise Fund), funding for MS4 permit related activities is derived from annual appropriations. The DPW, DDOT and DDOE receive appropriations from the general fund. DDOE also receives federal grants to implement the SWMP (DDOE 2009a).

Prior to the revised stormwater fee, a flat user charge was billed to customers to fund compliance with the 2000 and 2004 MS4 permits. The fees were again revised in 2008 to ensure adequate funding to comply with the commitments in the Letter of Agreement, which was estimated at $13 million per year (DDOE 2009a). Because a property's impervious surface is directly correlated to the amount of stormwater runoff the property generates, a fee structure based on impervious area is thought to allow for a more equitable distribution of the District's stormwater management costs then a structure based on a flat user charge. DDOE is finalizing a Stormwater Fee Discount Program. This program will provide financial incentive for stormwater retrofits, by reducing the stormwater fees of property owners that install stormwater management practices. Eligible practices will be focused on practices that reduce the volume of stormwater runoff generated, such as bioretention, permeable pavements, green roofs, etc. DDOE expects to publish the details of this Discount Program for public comment in late 2010. Assuming that the final MS4 Permit for the District is essentially equivalent to the draft MS4 Permit, DDOE expects there to be a moderate increase in MS4 program expenditures during the next permit cycle. These expenditures will be funded through the DDOE stormwater fee. If the federal government and all other ratepayers continue to pay the stormwater fee, with a moderate upward adjustment, DDOE would have sufficient revenue to cover these expenditures.

However, to date, the Federal Government has elected to withhold payment of the District's Stormwater Fee (GAO letter of September 29, 2010: *Use of GAO's Appropriations to Pay the District of Columbia Stormwater Fee).* Unfortunately, the current DDOE SWMP, Permit and Letter of Agreement and related planning efforts were based on consideration of environmental factors, implementation costs, scheduling, and technical factors. A decrease in the fees collected will result in a reduction of funds available to us, and therefore will significantly impact and reduce the number and scope of management practices that the District could implement. Until this issue is fully resolved, EPA would do well to consider this predicament when issuing backstops in a situation where the jurisdiction lacks control. One possibility is that EPA might suspend issuance of the MS4 Permit pending determination that the MS4 charge is a permissible fee, as resolved by Courts or other political mechanisms. Another option would involve reducing the number and/or scope of the management practices that the new Permit would require the District to implement at a corresponding rate of the anticipated fee decrease. While there may be other possible resolutions to this difficult situation, the District is limited in the interim until it is resolved. As previously stated, we remain guided by stringent regulatory, legislative, and policy approaches to managing stormwater.

7.3 Nonsignificant Industrial Point Sources

In addition to the significant point source dischargers (Blue Plains/CSS and the MS4) there are nonsignificant industrial dischargers. Because of the anticipated relatively insignificant contribution to the overall nutrient and sediment loads in the District and sparse facility-specific data, these facilities are addressed in aggregate in this WIP except the Washington Aqueduct.

Table 17 identifies the facilities and their current permit limits. None have effluent permit limits for nutrients, with the exception of Navy Yard, which has nitrogen and phosphorus effluent limitations that must be achieved

by January 22, 2013, as a result of the Anacostia River TMDLs. The total nitrogen and total phosphorus effluent limits for Navy Yard are 695 pounds/year and 90.5 pounds/year, respectively.

Table 17. Nonsignificant Industrial NPDES Dischargers

NPDES Number	Facility Name	Total Suspended Solids
DC0000019	Washington Aqueduct	30 mg/L (AML[1]) (12 of 12 outfalls)
DC0000035	General Services Administration (GSA)—West Heating Plant	30 mg/L (AML)
DC0000094	PEPCO Benning Generating Station	30 mg/L (AML)
DC0000337	WMATA-Mississippi Ave DPS	30 mg/L (AML)
DC0000141	Washington Navy Yard	6,420 lbs/yr
DC0000175	Super Concrete Corporation	33 lbs/day (AML) 23.4 mg/L (AML)
DC0000345	World War II Memorial	30 mg/L (AML)
DC0000361	Walter Reed Army Medical Center	--
DC0022004	Mirant Potomac River Generating Station	30 mg/L (AML)[2]

[1]AML = average monthly limitation
[2]Applied to discharges from Outfalls 101, 102, 003, and 004 (all characterized in the fact sheet for the permit as handling low volume waste sources).

Table 18 summarizes the existing load at the nonsignificant industrial facilities in the District. Additional regulatory requirements are not expected to be imposed on these nonsignificant industrial dischargers. Any changes to effluent limits that may become necessary to meet the aggregate waste load allocation for these facilities will be addressed during the permit renewal process. The allocation assigned to the nonsignificant industrial dischargers was established at one percent (1%) of the total nitrogen and total phosphorus allocations for the District because there were no nutrient effluent limitations on any of the facilities and nutrient loads from these facilities are considered to be minimal, with the exception of Navy Yard for which the loads were already established. The aggregate sediment waste load allocation was established based on the total suspended solids effluent limitations for the facilities and is equivalent to 0.01 percent of the total sediment allocation.

The Washington Aqueduct is discussed separately below because additional activities are required to ensure the facility is in compliance with its TSS effluent limit of 30 mg/L. The Washington Aqueduct was assigned individual waste load allocations outside of the 1% assigned to the remaining nonsignificant dischargers.

Table 18. Aggregated Nonsignificant Industrial Dischargers Existing and Anticipated Future Annual Loads

Permitted Facility	NPDES Permit Number	TN (lbs/yr)	TP (lbs/yr)	TSED (lbs/yr)
GSA (West Heating Plant)	DC0000035	23,340	1,167	157,386
PEPCO- Benning	DC0000094			
Washington Navy Yard	DC0000141			
Super Concrete Corporation	DC0000175			
WMATA-Mississippi Ave DPS	DC0000337			
World War II Memorial	DC0000345			
Walter Reed Army Medical Center	DC0000361			
Mirant Potomac River Generating Station	DC0022004			

7.3.1 Washington Aqueduct

The Washington Aqueduct is run by the Army Corps of Engineers. The Dalecarlia facility in the District is considered a nonsignificant industrial discharger. However, currently there are significant sediment loads coming from the sedimentation basins.

7.3.1.1 Existing Loads and Planned Future Loads

Table 19 summarizes the current annual loads delivered to the Bay from the Dalecarlia facility and the anticipated future loads once the upgrades discussed in the following section are complete.

Table 19. Existing and Anticipated Future Annual Delivered Loads

	Year	TN (lbs/yr)	TP (lbs/yr)	TSED (lbs/yr)
Washington Aqueduct – Dalecarlia (DC0000019)	2009	182,085	20,617	17,427,496
	2011 (anticipated completion date)	950	107	90,105

7.3.1.2 Current Programs and Existing Capacity

A NPDES permit was initially issued to the Corps for the Washington Aqueduct in 1989 without numeric discharge limitations for total suspended solids, total aluminum, dissolved iron and total residual chlorine (USEPA 2003). When the NPDES permit for the Washington Aqueduct was reissued 2003, it contained numeric discharge limits for total suspended solids, total aluminum and dissolved iron (USEPA 2003). It was recognized that significant upgrades would be required to meet the numeric discharge limits.

To ensure the discharge limits were met within a reasonable time frame, EPA and the Army Corps of Engineers entered into a Federal Facility Compliance Agreement (FFCA), which established a schedule for the Washington Aqueduct to achieve compliance with, among other things, the numeric discharge limitations for TSS established in the NPDES permit (USEPA 2008). The TSS effluent limit is 30 mg/L. An alternatives evaluation and disposal study were subsequently completed to determine the best alternative that meets the permit requirements (USEPA 2003).

The Corps conducted an integrated Engineering Feasibility Study and Environmental Impact Statement to evaluate the alternative for managing water treatment residuals. Alternative E was selected. This alternative includes residuals processing on-site on the eastern portion of the Dalecarlia Water Treatment Plant property, designated as the East Dalecarlia Processing Site (USACE 2005). Residuals will be thickened and dewatered at the Processing Site (USEPA 2008). After processing, the dewatered residuals will be hauled to an offsite disposal facility (USACE 2005). The study estimated that eight 20-ton truck loads of dewatered residuals will be transported from the facility on a daily basis (USACE 2005).

In addition to the construction of a central residuals processing site, additional elements of the FFCA include (EPA 2008):

- Modification of the Dalecarlia sedimentation basins to permit installation of continuous residuals collection equipment, allowing residuals to be collected on site
- Construction of three residuals pumping facilities and a dredge system at the Forebay, Dalecarlia sedimentation basins and the Georgetown Reservoir, allowing residuals to be pumped to the processing facility.

- Construction of four gravity thickener basins to provide temporary storage of liquid residuals and to thicken residuals before dewatering.
- Expansion of the booster control station at the north end of the Dalecarlia Reservoir
- Installation of new underground liquid residuals conveyance pipelines.

The residuals processing facility will allow the residuals collected from the forebay portion of the Dalecarlia Reservoir and the sedimentation basins at the Georgetown Reservoir and Dalecarlia Water Treatment Plant to be thickened and dewatered prior to being hauled to remote disposal sites (EPA 2008). The residual processing facility will eliminate the discharge of residuals from the Dalecarlia (Outfall 002) and Georgetown Sedimentation Basins (Outfall 003 and 004), except on infrequent occasions when a discharge request is submitted at least two weeks prior to the proposed discharge. Outfall 002 is also the outfall for permitted discharge of sedimentation basin leakage and a spring located beneath the Dalecarlia basin (EPA 2008). Discharges from the other permitted outfalls (006, 007, 008, and 009) occur infrequently, ranging from once every one to five years to once every five to 10 years (EPA 2008). These discharges are associated with clearing, cleaning or inspection of the associated tunnel, conduit and reservoirs.

The FFCA schedule initially required full compliance with the numeric discharge limitations at all basins by December 30, 2009 (USEPA 2003). Through a FFCA modification, the deadline for compliance was extended to November 30, 2010 (USEPA 2008). A second modification to the deadline was requested in May 2010. The Army Corps of Engineers estimates that the facility will be completed and fully operational by September 30, 2011 (USACE 2010). The construction of the Residuals Processing Facility will allow for compliance with the discharge limitations in the permit. Sediment loads will be reduced by 99 percent after the Residuals Processing Facility is fully operational.

Construction has already begun on the residuals processing facility and the project is fully funded (USACE 2010). Construction spending was approved by the Washington Aqueduct Wholesale Customer Board up to $96 million, ensuring there are sufficient funds to complete the project (USEPA 2008).

7.4 Nonpoint Sources

7.4.1 Existing Loads

Based on the Chesapeake Bay Program Watershed Model Phase 5.3, nonpoint sources in the District of Columbia contributed 162,084 pounds of total nitrogen, 21,214 pounds of total phosphorus and 6,108 tons of sediment to the Chesapeake Bay in 2009. These loads represent about 6 percent of the nitrogen, 25 percent of the phosphorus and 38 percent of the sediment delivered to the Chesapeake Bay from the District of Columbia. Urban runoff is the most significant contributor to the nonpoint source nutrient and sediment loads, contributing about 88 percent of the nonpoint source total nitrogen load, 97 percent of the nonpoint source total phosphorus load and 94 percent of the nonpoint source sediment load. Much of this load is attributable to the MS4 permitted drainage area and is addressed in Section 7.2.

This section addresses the non-MS4 nonpoint sources of nutrients and sediment in the portion of the District referred to as "Other Areas" since it is outside the regulated CSS and MS4 boundaries. The nonpoint sources contributing to this load are unregulated urban runoff, forest lands and non-tidal water deposition. Much of the unregulated urban runoff is from federal properties, such as Joint Base Anacostia-, the largest urbanized area outside of both the MS4 and CSO systems, and from stream bank erosion. Federal programs to manage urban runoff are discussed in Section 7.5.

Table 20 summarizes the current nutrient and sediment loads from the Other Areas. Nonpoint source pollution reduction strategies will result in an 18 percent reduction in the amount of total nitrogen, 44 percent reduction in the total phosphorus and 47 percent reduction in the sediment load the Other Areas contribute to the Chesapeake Bay. The programs and resources that will be utilized to achieve these reductions are discussed in the following sections.

Table 20. Current Loads in the Other Areas

Year		Total Nitrogen (lb/yr)	Total Phosphorus (lb/yr)	Sediment (lb/yr)
2009	ANATF_DC	14,573	2,770	751,133
	ANATF_MD	786	159	35,675
	POTTF_DC	24,912	2,215	2,908,086
	POTTF_MD	1,766	73	54,146
	Total	42,037	5,217	3,749,040

7.4.2 Current Programs and Capacity (N, P, Sediment)

Many of the stormwater BMP and LID programs used to address nonpoint source pollution in the MS4 system are also applicable to areas outside of permitted drainages and are discussed in Section 7.2. This section focuses on the efforts to reduce pollution contributions through watershed planning and natural resource protection.

The mission of the District Department of the Environment, Watershed Protection Division, Planning and Restoration Branch is to "conserve the soil and water resources of the District of Columbia and to protect its watersheds from pollution through education and outreach, stream and habitat restoration, innovative stormwater management and watershed planning" (DDOE 2010a). It is through this branch that projects such as urban riparian forest buffers, tree plantings and wetland and stream restoration are implemented. These projects are generally not conducted to comply with MS4 permit requirements but may be implemented within the MS4 service area or outside it. These projects are often funded through Clean Water Act 319 funds. The outcome of such projects is improved water quality.

Tree Planting

In addition to the efforts of the DDOT's Urban Forestry Administration to plant and maintain the District's trees, as discussed in Section 7.2.2.7, the DDOE contributes to tree planting efforts in the District. The watershed implementation plans developed for the subwatershed of the Anacostia River include goals of expanding the width of riparian forest buffers and enhancing their capacity to improve water quality (DC DOH 2004). The RiverSmart Homes program started in 2008 is the newest source of tree planting in the District. The goal is to have 1,000 trees planted through this program by the end of 2011. In 2010, 266 trees were planted through the program. The RiverSmart Homes program is only in its second year of being offered throughout the District, therefore interest, growth and expansion of the program is expected. Expansion of the RiverSmart Homes program will add to the number of trees planted throughout the District annually. The partnership between DDOE and Casey Trees is extremely strong and they often work together on volunteer tree plantings throughout the District.

Stream and Wetland Restoration

Previous studies and the *TMDL for Sediment/Total Suspended Solids for the Anacostia River Basin in Montgomery and Prince George's Counties, Maryland and the District of Columbia* indicate that stream channel erosion is the most significant nonpoint source of sediment. Across the entire Anacostia River Basin, it accounts for 73 percent of the annual sediment load (MDE and DDOE 2007). The District anticipates significant phosphorus and sediment load reductions from stream restoration projects along the Anacostia and Potomac rivers and their tributaries.

The Planning and Restoration Branch within the Watershed Protection Division at DDOE plan, fund and oversee activities that will protect and restore river, stream and wetland habitats in the District. The goal is to improve water quality and ecological diversity in the District through the restoration of streams and wetlands. Unlike many states within the Chesapeake Bay Watershed, the District only has about 39 miles of streams, most of which are on federal parklands (DC DOH 2004).

Past projects completed by the Planning and Restoration Branch include the Kingman Lake Wetland project, the River Fringe wetland project, and the Heritage wetland project. The Kingman Lake Wetland restoration was completed in 2000. The project restored over 40 acres of freshwater tidal wetlands at Kingman Lake in the Anacostia River. The River Fringe project was completed in 2003 and restored 17 acres of freshwater tidal wetlands along the Anacostia River, adjacent to Kingman Island. The Heritage wetland restoration was completed in 2006 and it created six acres of high to mid freshwater marsh in Kingman Lake.

Projects currently underway include the Watts Branch Stream Restoration, the Broad Branch stream restoration, and the Pope Branch stream and watershed restoration. The Watts Branch and Pope Branch restorations are included in the District's 2-Year Milestones for 2009-2011.

The Watts Branch restoration is designed to restore the in-stream habitat and improve the water quality of Watts Branch, which is a tributary to the Anacostia River. This project is part of a larger effort to restore the watershed. The stream will be reconstructed to better handle stormwater flows and LID retrofits will be installed simultaneously to improve the quality of stormwater runoff entering the stream. Sanitary sewer infrastructure will also be repaired at the same time. This project is a partnership between DDOE, DDOT, DC WASA, DC Parks and Recreation, Washington Parks and People and the Deputy Mayor's Office for Planning and Economic Development. Designs for the restoration project were completed in September 2010; construction on the project will begin in January 2011 and last approximately nine months. Sewer line replacement in Watts Branch has begun and will continue into 2011.

The Pope Branch restoration is intended to improve water quality through the repair and replacement of sections of the sanitary sewer line, while restoring a section of the stream from Texas Avenue to Minnesota Avenue and constructing several LID stormwater retrofits. This project is a partnership between DDOE, DC WASA, DC Parks and Recreation and the Pope Branch Alliance. Designs were completed in October 2010 and construction is expected to begin in early 2011.

Broad Branch Stream Daylighting project is a large-scale stream and habitat restoration for a portion of Rock Creek's Broad Branch tributary. The portion of the stream to be daylighted is approximately 1,600 feet and is in parkland and undeveloped land. This 1,600 foot section of Broad Branch has approximately 171 acres of drainage. Daylighting this section of Broad Branch which is in the Rock Creek watershed, will improve water quality at this location and downstream by exposing water to sunlight, air, soil, and vegetation, all of which help remove pollutants. This project will also reduce nutrient and sediment pollution from erosion caused by fast flowing stormwater by creating meanders and floodplain wetlands which will have wider cross-sections and a greater channel depth than the pipe it will replace. The project will also increase stream habitat and wetland flora and fauna. This project is a partnership between DDOE, DDOT, DC WASA and the National Park Service.

Regenerative Stormwater Conveyances (RSC) combine features and treatment benefits from filtering practices, infiltration, swales and wetlands to provide enhanced stormwater management. The RSCs use carbon-rich, sand-bed channels, wide parabolic grade control weirs, and shallow pools to collect and convey stormwater runoff. These RSCs safely convey surface water flows while recharging the ground water resources and improving water quality through soil media filtration, floodplain connection, and vegetative measures. Shortly after construction, RSCs become an indistinguishable part of the environment, making them a truly sustainable environmental restoration alternative (AWRA 2009). DDOE is making use of the American Recovery and Reinvestment Act stimulus funds to install regenerative stormwater outfalls in Pope Branch and two tributaries to Rock Creek: Milkhouse Ford and Bingham Run. Regenerative stormwater conveyance systems are a new technology that the District plans on using to help restore its streams. DDOE hopes to install three of these systems per year. However, DDOE does not own any property and therefore needs buy-in from property owners to install these systems. Most District streams are located on Federal property.

In 1999 the District developed the Anacostia Watershed Restoration Action Strategy to identify smaller, manageable watershed restoration projects along the Anacostia River and its Tributaries. The District has also developed watershed implementation plans for many of the tributaries to the Anacostia River and for Rock

Creek. These subwatershed implementation plans include strategies to reduce stormwater runoff, strategies for stream restoration, targeted community outreach and development of community watershed stewards, and institutional and regulatory change recommendations (DC DOH 2004).

In 2008 the District developed the Anacostia 2032: Plan for a Fishable and Swimmable Anacostia River. Along with several other pollutants and restoration goals, the document addresses sediments and stream and wetlands restoration. The document outlines numerous strategies for reducing sediment, including increased street sweeping, LID, a stronger tree canopy goal and expanded stream restoration efforts (DDOE 2008). Stream restoration projects include restoration of Hickey Run, Watts Branch, and Pope Branch. Under a separate goal which addresses inadequate habitat, numerous projects are identified that could also have a beneficial effect on nutrients and sediment reduction. These include, construction of fringe wetlands at the outfall of Ft. Dupont, additional wetlands in Kingman Lake, daylighting of a Pope Branch tributary, Hickey Run tributary and mainstem natural channel restoration, creation of a floodplain through removal of a seawall, and stream restorations at Watts Branch and Pope Branch, many of these projects are now underway and discussed above (DDOE 2008).

7.4.3 Anticipated BMP Implementation in the Others Area 2010-2025

The Other Areas nutrient and sediment allocations are based on the nutrient and sediment load reductions achievable, as determined by the Chesapeake Bay Model Phase 5.3, based on the implementation activities in the Other Areas. Implementation activities and stormwater retention requirements are the same as in the MS4 area and were outlined in Table 14 in Section 7.2.5.

The allocations established for the Other Areas require a 18 percent reduction in the amount of total nitrogen, 44 percent reduction in the total phosphorus and 47 percent reduction in the sediment, as compared to 2009 loads.

One of the artifacts of the Chesapeake Bay Watershed Model not explicitly identifying the MS4 loading is that the load estimation methodologies yield some discrepancies in the loading distribution between the MS4 and Other Areas. The Other Areas load from POTTF_MD appears to increase between 2009 and 2025; although, the total POTT_MD load from both the MS4 and Other Areas load together still decreases. This increase in the Other Areas load is an artifact of EPA's data presentation, and the District does not believe that the actual load is increasing.

Table 21 and Figure 17 through Figure 19 summarize and illustrate the anticipated reductions from the impaired Bay segment-sheds.

Table 21. Anticipated Loads as a result of implementation activities

Year		Total Nitrogen (lb/yr)	Total Phosphorus (lb/yr)	Sediment (lb/yr)
2009	ANATF_DC	14,573	2,770	751,133
	ANATF_MD	786	159	35,675
	POTTF_DC	24,912	2,215	2,908,086
	POTTF_MD	1,766	73	54,146
Total		42,037	5,217	3,749,040
2017	ANATF_DC	12,933	2,115	549,838
	ANATF_MD	701	100	22,868
	POTTF_DC	22,534	1,790	2,245,068
	POTTF_MD	2,124	57	45,523
Total		38,292	4,062	2,863,298
2025	ANATF_DC	11,293	1,459	348,544

Year		Total Nitrogen (lb/yr)	Total Phosphorus (lb/yr)	Sediment (lb/yr)
	ANATF_MD	616	41	10,062
	POTTF_DC	20,156	1,365	1,582,051
	POTTF_MD	2,481	42	36,900
Total		34,546	2,907	1,977,557
Allocation		34,546	2,907	1,977,557

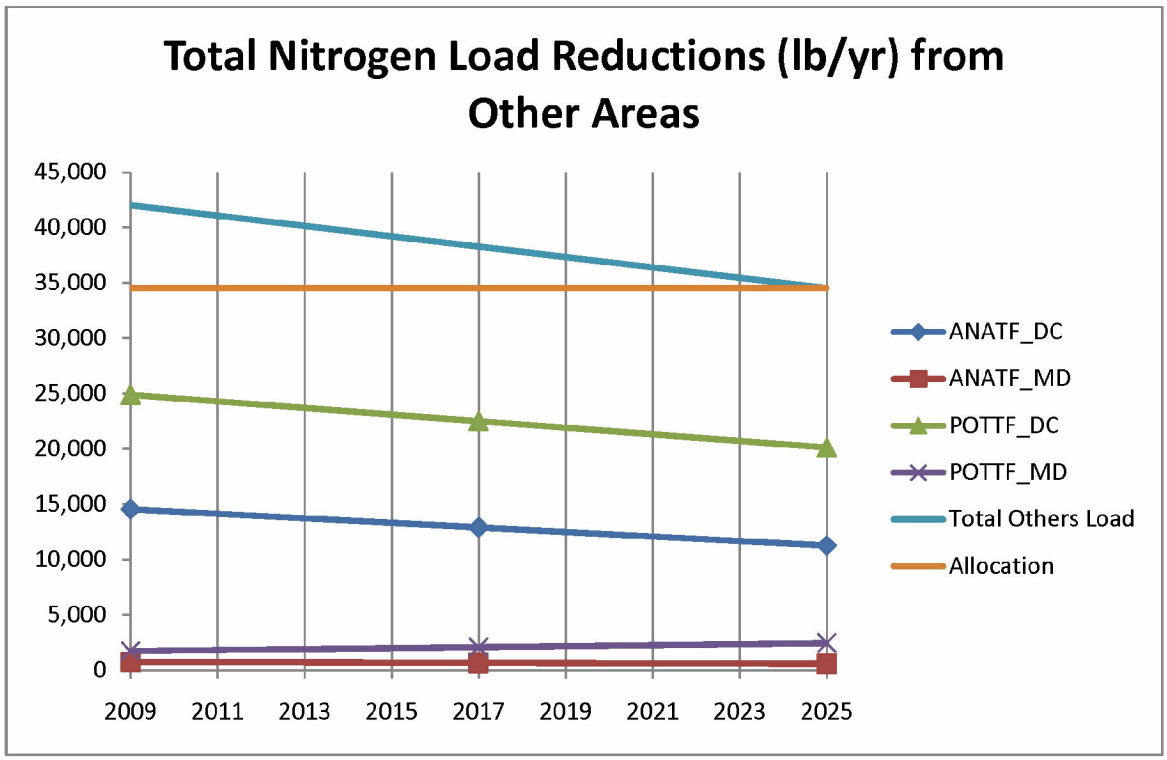

Figure 17. Total Nitrogen Reductions and Allocation for Other Areas

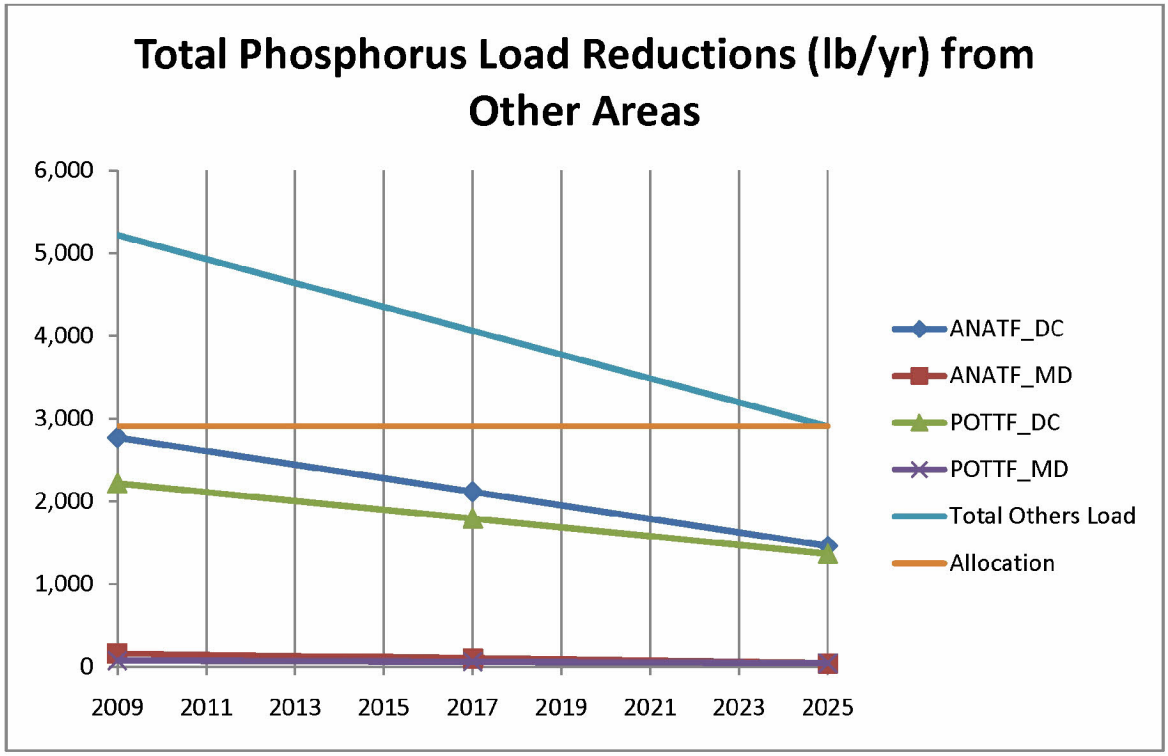

Figure 18. Total Phosphorus Reductions and Allocation for Other Areas

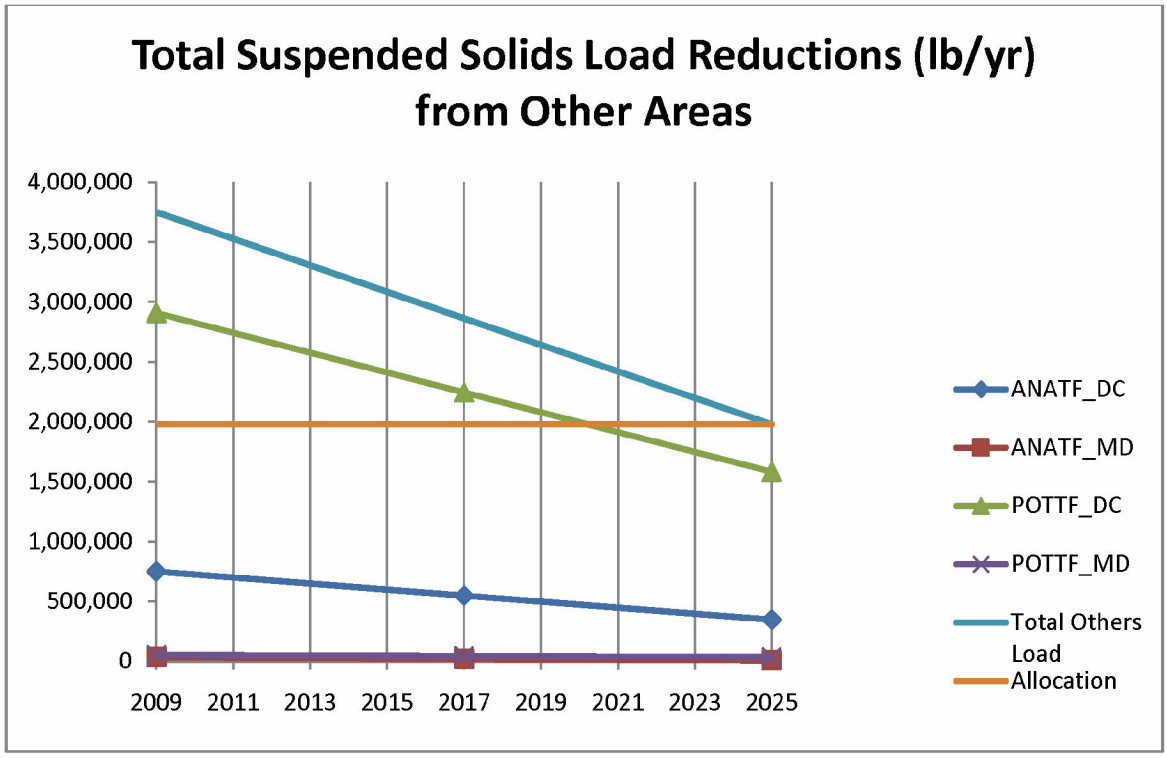

Figure 19. Total Suspended Solids Reductions and Allocation for Other Areas

7.5 Federal Facilities

7.5.1 Existing Loads

Stormwater runoff must be controlled District-wide in order to achieve compliance with nutrient and sediment allocations. Federal facilities comprise 30 percent of the surface area of the city, thereby making their cooperation crucial to the success of the District in any stormwater control effort. Table 22 below shows the loads from the CBW model P5.3 that have been apportioned to the Federal lands (CBPO, November 22, 2010).

Table 22. Federal Loads by Chesapeake Bay Segment in DC

Bay Segment-shed	TN (lbs/yr)	TP (lbs/yr)	TSS (lb/yr)
ANATF_DC	15,076	2,277	564,000
ANATF_MD	683	85	18,000
POTTF_DC	17,043	1,368	1,600,000
POTTF_MD	1,387	40	30,000

7.5.2 Current Programs and Capacity

The President's May 2009 Executive Order #13508 addresses the critical issue of the role that Federal agencies play in relation to the states and the District of Columbia. The Executive Order calls for federal partners to develop strategies and action plans to hasten their roles in the Bay restoration. Subsequently, the Federal Leadership Committee (FLC) issued their May 2010 *Strategy for Protecting and Restoring the Chesapeake Bay Watershed*, and the Federal Office Directors issued an Action Plan.

Urban stormwater runoff is a major water quality problem within the District. It is impossible for the District to solve this problem without cooperation from the Federal partners because they control 30 percent of the land within the District.

Two years ago, the Energy Independence and Security Act of 2007 ('EISA') [Public Law 110-140] became law. Specifically, Section 438 of this Act directs federal agencies (property owners) to begin managing stormwater on their sites more effectively than is currently practiced. "The sponsor of any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow" (EISA Section 438).

As EISA took effect, DDOE began in earnest to coordinate with our federal partners. DDOE initiated and conducted a workshop for federal facilities in March of 2009 to explain the EISA language and its impacts on federal facilities. The purpose of the workshop was to explore innovative ways in which these agencies might implement measures to comply with EISA's 1.7 inch retention standard – or other ways to control stormwater runoff. Some of the attendees of this workshop included: USDA, GSA, DoD, National Park Service (DOI), Metropolitan Washington Council of Governments, and Natural Resources Defense Council. Each agency presented their current and planned stormwater activities and outlined how they might achieve EISA terms. One lesson learned that day was that even when good intentions are expressed, budget constraints stand in the way of commitments. This workshop paved the way for more open communications since then, but federal commitments remain elusive.

The District continues diligently to work with its Federal partners to develop measurable processes to reduce stormwater runoff from their properties. In fact, DDOE Director Tulou appealed directly to USEPA Administrator Lisa Jackson in her capacity as Chair of the Federal Leadership Committee. Director Tulou submitted his letter of appeal in early November to convey the seriousness of the situation, and to point out that EPA Region III offered to assist the District in obtaining federal commitments. In a September 28, 2010 communiqué to DDOE, Region III expressed the following: "*EPA will engage the assistance of the other*

federal partners in the Bay restoration through the Federal Leadership Committee to assist in securing the support needed here." The District lacks the capacity to obtain federal commitments and the authority to compel them to comply with state (District) directives, for example to install LID measures, such as green roofs. Our ability to fulfill EPA's expectations (of federal compliance) is compromised by the US Government Accountability Offices' determination that federal agencies are not required to pay DC's Stormwater Fee – citing the Supremacy Clause of the US Constitution.

In response to EISA Section 438, EPA issued guidance for replicating predevelopment hydrology using green infrastructure and Low Impact Development practices (GI/LID). In order to increase accountability, federal agencies are supposed to establish milestones every two years for actions to make progress toward measurable environmental goals – as prescribed in the Executive Order, if they are assigned loads by the District. However, the District will not be assigning load allocations to federal agencies. This is not a viable option for DC. It is hoped that through open communication and a willingness to work together, the voluntary federal milestones will complement the Districts' two-year milestones to achieve our WIP and Bay TMDL goals. DDOE is planning to host a meeting, along with the EPA, for Federal facilities. The meeting will focus on expectations from the Federal facilities for participation in the DC WIP and Bay TMDL as well as the Executive Order and the Executive Order 2011 Action Plan.

A list of point of contacts from each of the District's Federal partners is provided in Table 23 and is followed by some initial plans to implement BMP/LIDs based on input provided by each of the point of contacts. Refer to Figure 20 for the boundaries of the federal lands discussed in the next section.

Table 23. Federal Agency Points of Contact for EISA Compliance

Federal Agency/Facility	Point of Contact
DoD –Navy/ Joint Base Anacostia-Bolling (JBAB), Navy Yard, Naval Observatory	Jennifer Steele
DoD - Army/Ft McNair	Wanda Gooden PhD
DoD - Army National Guard	Bill Dzeda/Dana Sacoman
General Services Administration (GSA)	Lance Davis
Architect of the Capitol (AOC)	Chuck Iliff
Smithsonian Institution	Ann Trowbridge
National Arboretum	Ramon Jordan PhD
NPS - Rock Creek Park	Bill Yeaman/Nick Bartolomeo
NPS - Chesapeake and Ohio Canal	Chris Stubbs
NPS - George Washington Memorial Parkway	Brent Steury
NPS - National Capital Parks - East	Stephen Syphax
NPS - National Mall and Memorial Parks	TBD

TBD: To be determined

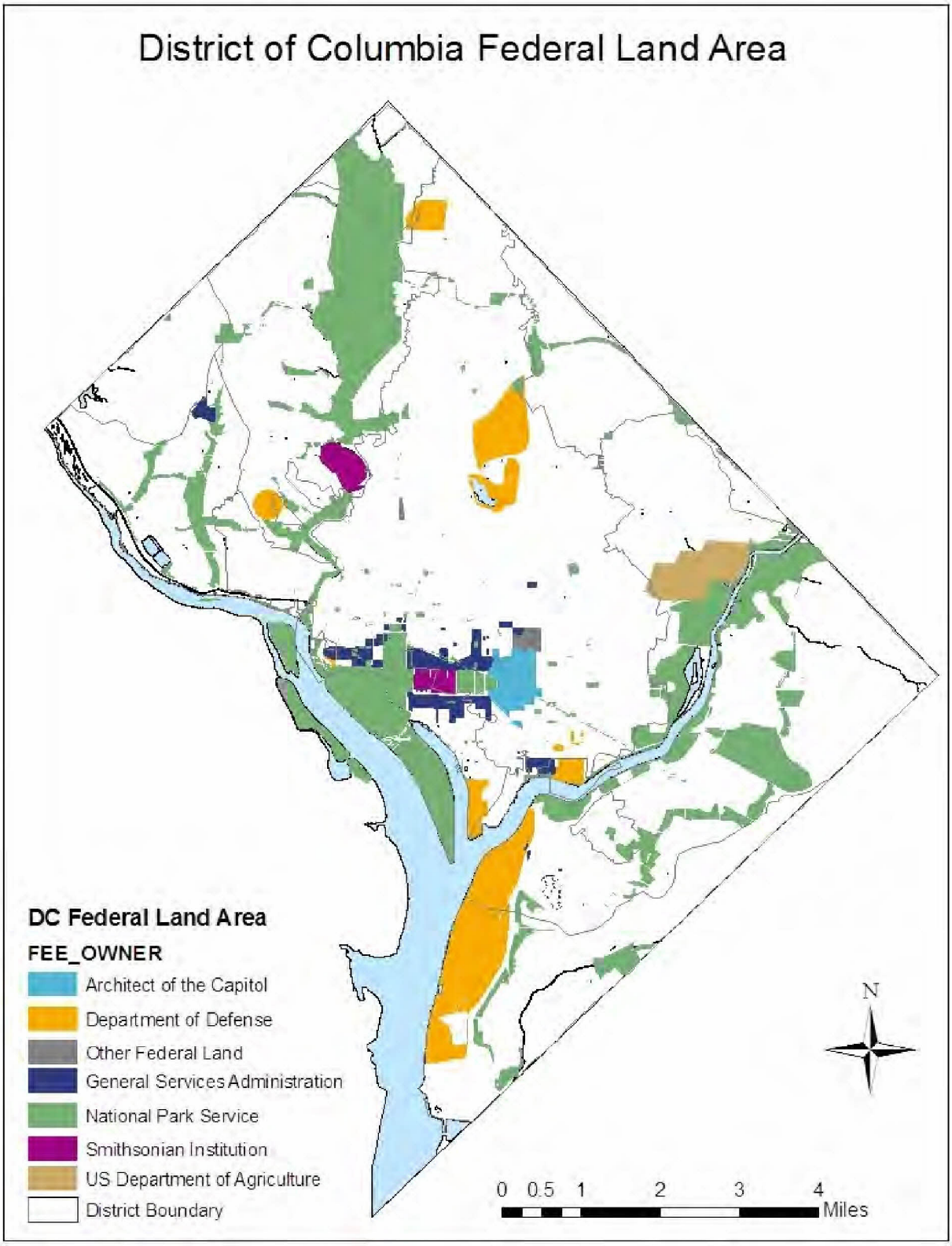

Figure 20. Location and Ownership of Federal Land in the District.

7.5.2.1 Federal Agency Implemented and Planned Activities

The National Park Service (NPS) is the primary public entity holding land within the District. According to the Government Accounting Office Report No. GAO-05-378, NPS manages 356 Federal properties in the District covering approximately 6,735 acres of land (including Rock Creek Park). A majority of NPS properties are referred to as circles, squares and triangles less than one acre in size; however, parks and parkways represent approximately 93 percent of the total acreage for the 356 properties.

The National Park Service plays a significant role in the District's goals for stream restoration and tree canopy expansion. Most streams in the District are located on Park Service property, therefore, the District must have full cooperation from the Park Service in order to conduct stream restoration projects or install regenerative stormwater conveyance systems. Then National Park Service holds the majority of undeveloped land in the District. Undeveloped land will play a large role in tree planting initiatives to meet the District's 40% tree canopy goal. In order for the District to meet the 40% tree canopy goal, 8,600 trees per year have to be planted. The District UFA and environmental groups plant an average of 6,000 trees per year. This leaves a gap of 2,600 trees that need to be planted in the remaining one-third area of the District that is comprised of federal land.

Upcoming projects in the NPS are discussed below:

- Upcoming projects in the National Capital Parks East (NCP-East) area include the Anacostia Riverwalk Trail that is being constructed in sections; each section will have BMPs/LIDs. Currently, sections 1 and 3 of the Anacostia Riverwalk Trail are under construction, both sections will include stormwater biocells. In addition, NCP-East is working with DDOE to in installing a stormwater biocell along the Kenilworth Park boundary (J Street NE). This biocell is part of a series of biocells in that Watts Branch area that will not only improve stormwater quality and infiltration, but will reduce flooding which has been an issue in that section of Jay Street. NCP-East is also looking at possible opportunities that may arise to retrofit stormwater management. The Anacostia Riverwalk projects are also part of the MS4 2007 Letter of Agreement requirements. The Park Service will work with the District to develop buffers for the upcoming recreation land transfer at Fort Dupont Park. This will help reduce the impact (stormwater runoff, etc.) of the planned recreational development on the Fort Dupont stream below. NCP-East planted or replaced 338 trees in FY10 and plan on planting or replacing approximately 421 trees in FY11.

- Upcoming projects in the Rock Creek Park include projects which plan on using the 319 non-point source funding to do regenerative stormwater conveyance for Bingham Run and stream daylighting for Broad Branch along with bioretention. The National Park Service intends to use stimulus funding for Milkhouse Ford regenerative stormwater conveyance. Rock Creek Park has several important upcoming projects. The Broad Branch stream daylighting project will expose 1,600 feet of stream to approximately 171 acres of drainage. Daylighting this section of Broad Branch which is in the Rock Creek watershed, will improve water quality at this location and downstream by exposing water to sunlight, air, soil, and vegetation, all of which help remove pollutants. This project will also reduce nutrient and sediment pollution from erosion caused by fast flowing stormwater by creating meanders and floodplain wetlands which will have wider cross-sections and a greater channel depth than the pipe it will replace. Both Bingham Run and Milkhouse Ford are receiving regenerative stormwater conveyance systems. The systems will restore, stabilize and protect natural stream channels and riparian habitat along approximately 1,250 feet of Bingham Run and 2,300 feet of Milkhouse Ford. In addition to all of the stream restoration work, Rock Creek has been planted 360 trees in FY2010 and plan on planting 124 trees in FY2011. Also, the Federal Highway Administration is rebuilding Rock Creek and Potomac Parkway between P Street and Calvert Street over the next 18 months. Part of this rebuilding will include the replacement of 62 stormwater catch basins/inlets with water quality catch basins which will improve stormwater runoff quality.

- The C & O Canal covers approximately 357 acres within the District, while the entire park encompasses over 20,000 acres. Most of the length of the park, a protective riparian buffer is maintained along all watercourses, including the Potomac River. Replacement of the Thomas Jefferson St. bridge is currently being undertaken by the Federal Highway Administration and it is the C&O Canal's understanding that they have all necessary permits from DC and the Corps of Engineers. In the next two years, the C&O Canal will begin restoring Canal Lock 3, a project that will require less than an acre of ground disturbance. All required watershed protection measures will be followed, and sediment and erosion control permits will be obtained.

- The George Washington Memorial Parkway (GWMP) has no projects planned at this time. However, they do require a 1 to 1 diameter at breast height mitigation for any tree loss that may result from development activities in the park. Most of the trees planted along the GWMP are based on a historic planting plan; additions to this plan are not encouraged.

The Department of Defense (DoD) federal lands occupy the second largest area in the District after the NPS federal lands. In July 2010 the DDOE met with the DoD to discuss EISA implementation and the watershed implementation plan. DoD indicated that in October 2004, DoD issued Unified Facilities Criteria on Low Impact Development (LID) (UFC 3-210-10), a stormwater management strategy designed to maintain the hydrologic functions of a site and mitigate the adverse impacts of stormwater runoff from DoD construction projects. Since 2004, DoD has implemented LID techniques for controlling stormwater runoff on a number of projects. DoD plans on implementing EISA Section 438 and the EPA *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act,* using LID techniques in accordance to EISA guidance. The DoD is interpreting the predevelopment hydrology clause in EISA to mean pre-project development hydrology. This interpretation may be less stringent than the forthcoming standards in the DC MS4 Permit and could therefore create a discrepancy. Upcoming projects in the DoD federal lands include:

- Construction at JBAB on the Navy Systems Management Activity (NSMA) Administration Facility and Warehouse will begin in FY2010, on the northwest corner of Thomas Road and Brookley Avenue. The NSMA will include six bioretention facilities that treat 6.56 acres of drainage, reinforced earth paving in areas where only vehicular loading is anticipated, and a green roof is planned for a significant portion of the proposed building. The Band Annex Building is scheduled to begin construction at the Anacostia Naval Annex in FY 2012 and will incorporate LID techniques.

- Construction will begin at JBAB in FY11 on a command center, the JADOC project. LID techniques will be incorporated in the project.

- Sixty (60) trees were planted at the Navy Yard in FY10, some of the planting were to replace damaged trees while others were new plantings.

- The Naval Observatory plans to implement a forest management plan in FY11. This plan will involve removing hazard trees and replacing them with native species, as well as planting new trees in some areas.

- The Marines are demolishing Henderson Hall which will create 3 acres of pervious grassland.

- The Army National Guard installed a BaySaver at the Armory facility located at 2001 E. Capitol St. SE. The BaySaver was installed when the parking lots were repaved.

- A tree survey was conducted by Casey Trees at Ft. McNair in conjunction with the Army. The survey resulted in the need for 35 trees to be planted in FY11 due to the loss of trees in previous storm events.

The General Services Administration (GSA) owns and leases several buildings in the District. Approximately 112 buildings are owned by GSA in the District. Upcoming projects in the GSA federal lands include:

- Green roofs on the following buildings : (i) Frances-Perkins Building, DOL (200 Constitution Avenue NW) (ii) Robert Kennedy Building, DOJ (900 Constitution Avenue NW), (iii) IRS Building (111 Constitution Avenue NW), (iv) Forrestal Building, DOE (1000 Independence Avenue SWA), (v) FOB 10A (800 Independence Avenue SW), (vi) FOB 10B (800 Independence Avenue SW), and (vii) Wilbur J Cohen Building (330 Independence Avenue SW).

- BMP/LID work at St. Elizabeth's and Department of Energy is planned.

The Architect of the Capitol (AOC) is a federal agency that is responsible for the maintenance, operation, development, and preservation of the United States Capitol Complex. The Executive Order does not apply to the AOC but EISA Section 438 does. As such, the AOC has included EISA Section 438 into design standards for new projects.

- The AOC is currently embarking on a Stormwater Management Plan for the Capitol complex. The plan addresses EISA as follows: "It is of intent of this project to develop a Capitol Complex stormwater pollution prevention and management program designed to reduce the discharge of pollutants to the municipal storm drainage system to the maximum extent practicable. The Program shall be developed in accordance with Section 438 of the Energy Independence and Security Act as enacted by Congress in 2008 and meet the stormwater requirements of the District Department of the Environment in effect as of the award of this project." The plan is being done in four stages, funding has been awarded for the first two phases and additional funding is being sought in FY12 for the final two. The AOC plans to make recommendations in the plan for LID techniques not only for environmental and social concerns but also for the preservation of the historic Capitol Grounds. The AOC is currently operating under a continuing resolution; as a result there is no FY11 funding for stormwater related projects.

- The AOC completed a project in FY10 at the US Botanical Garden that reduced stormwater flow to the CSS while demonstrating sustainable design strategies in urban settings to the public. This project included the construction of a rain garden on the East side of the Botanical garden conservatory. This study also identified a variety of other strategies that may be implemented in the coming years, such as: additional rain gardens, rain barrel installation, porous sidewalk installation, cistern installation, bio-retention area installation, and green roofs.

- The Botanical Garden plans to install infiltration trenches on the NW side of the botanical garden conservatory in FY11.

- A study was completed at the AOC Blue Plains facility with assistance from the US Army Corps of Engineers to determine the feasibility of stormwater infrastructure and possible wetland creation on the Botanical Garden property. The Army Corps is evaluating an area of washout and erosion adjacent to an existing road on the property which may necessitate a stormwater facility, while a wooded area on the property would be an ideal area to create wetlands to mitigate stormwater flow.

- The Botanical Garden is also designing the final phase of the Bartholdi Park Restoration. This project is a pilot project for the Sustainable Sites Initiative (http://www.sustainablesites.org), which as the website states, is "an interdisciplinary effort by the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center at The University of Texas at Austin and the United States Botanic Garden to create voluntary national guidelines and performance benchmarks for sustainable land design, construction and maintenance practices." This final phase of Bartholdi Park seeks to contain and reuse all stormwater that falls on the site. Funding for this project has not yet been identified.

The U.S. Department of Agriculture Agricultural Research Service runs the National Arboretum. The Arboretum is 446 acres. Upcoming projects in the National Arboretum include:

- The National Arboretum in partnership with the District Department of the Environment and Friends of the National Arboretum has committed to use regenerative stream design to restore the portion of Springhouse Run, a tributary of Hickey Run that flows overland through the Arboretum. During FY 2011 the Arboretum will work with DDOE to complete designs for Spring House Run Restoration. In addition DDOE and the arboretum will design bio-retention cells that will treat stormwater runoff from the R Street parking lot.

- The Arboretum and the USDA Agricultural Research Service have partnered with the US Army Core of Engineers and the District Department of the Environment to install a pollution abatement structure at New York Avenue outfall where Hickey Run daylights. This project will help to prevent excessive trash and sediment loads from reaching the day-lighted portion of Hickey Run which meanders through the arboretum and eventually reaches the Anacostia River. This project will be completed in FY 2011.

The Smithsonian Institution is considered federal land property and is composed of 17 museums, and the National Zoo within the District. The Smithsonian Institution has not responded to DDOE inquiries about the installation of BMPs/LIDs or their interpretation of EISA other than to say that they are not a federal agency.

Table 24 summarized the stormwater BMPs that are known to have been installed on federal properties from 2005 to 2010. Figure 21 shows the location of these BMPs.

Table 24. Summary of the stormwater BMPs installed at Federal facilities between 2005 and 2010.

Year	Facility	Address	BMP type
2005	Army	Fort McNair SW	bioretention stormwater treatment system
2005	Bolling Air Force Base	Bolling AFB SW	infiltration trench
2005	Botanical Garden	1 Maryland Ave, SW	Stormceptor Underground (Std) Sandfilter
2005	Fed Highway Admin	George Washington Mem Pkwy NW	water quality inlet water quality inlet
2005	Navy	3450 Massachusetts Ave, NW	Dry Pond
2005	*NPS*	Henry Bacon Dr & Daniel French Dr NW	snout snout
2005	NPS	North Waterside Dr NW	water quality inlet water quality inlet
2005	USDA	4300 New York Ave, NE	Surface Sandfilter
2005		225 33rd St, SE	Water Quality Swale
2005		2400 E. Capitol, SE	Baysaver Baysaver
2006	*AOC*	1 Independence Ave SE	catch basin (DC WASA std/spec)
2006	Army	Fort McNair SW	Baysaver
2006	Bolling Air Force Base	Bolling AFB SW	underground (std) Sandfilter
2006	FAA facility	3903 Chesapeake St, NW	Underground (Std) Sandfilter
2006	Fed Highway Admin	Rock creek & Potomac ave NW	double water quality inlet modified catchment manhole
2006	FHWA	Q St from 14th to 11th, NW	Catch Basin w/ Water Seal Catch Basin w/ Water Seal Catch Basin DC WASA Std/Spec

Year	Facility	Address	BMP type
2006	*NPS*	10th-Constitution NW	catch basin w/ water seal catch basin w/ water seal
2006	*NPS*	15th Penn NW	catch basin w/ water seal
2006		40th and Anacostia Ave NE	Water Quality Inlet
2007	Army	Fort McNair Defense Univ NW	Baysaver Baysaver Baysaver
2007	Bolling Air Force Base	Bolling AFB SW	underground (std) Sandfilter water quality manhole
2007	DDOT	Anacostia Freeway, SE	Water Quality Swale
2007	NPS	1900 Anacostia St, SE	Bioretention Bioretention
2007	NPS	3201 Water St, NW	Bioretention
2007	Smithsonian Nat'l Zoo	3001 Connecticut Ave, NW	Baysaver
2007	USDA	3501 New York Ave, NE	Wetland Water quality swale
2007	USDA	3501 New York Ave, NE	Bioretention
2007		3700 North Capitol, NW	Bioretention Bioretention Bioretention
2008	*Air Force*	Duncan Ave-Bolling AFB SE	Stormfilter
2008	*Marine Barracks*	8th and Eye SE	Stormceptor
2008	Navy	6001 M St, SE	Underground (Std) Sandfilter
2008	NPS	Presidential Park NW	ex-filtration trench ex-filtration trench
2008	Smithsonian Nat'l Zoo	3001 Connecticut Ave, NW	Stormfilter
2008		Georgetown waterfront park NE	vegetated biofilter, swale, strip (infiltration practice)
2008		31st and K St NW Georgetown waterfront park	bioretention-infiltration practice
2009	Bolling Air Force Base	Bolling AFB SW	Baysaver vegetated biofilter, swale, strip
2009	Fed Highway Admin	PRA-NAMA 11(4) NW	water quality catch basin water quality catch basin
2009	NPS	Jefferson Memorial Seawall SW	oil-grit separator (vortechnics) oil-grit separator (vortechnics)
2009	Smithsonian Nat'l Zoo	3001 Connecticut Ave, NW	Rainstore System
2009		161 Tingey St, SE	Stormfilter
2010	*NPS*	14th St. and Constitution Ave NW	catch basin insert catch basin insert catch basin insert

Year	Facility	Address	BMP type
2010	Smithsonian	14th St. and Constitution Ave, NW	Catch Basin Insert
2010		Amtrak	Infiltration Trench
2010		3801 Nebraska Ave, NW	Baysaver

Note:
AOC = Architect of the Capital
LOC = Library of Congress
NPS = National Park Service
USDA = U.S. Department of Agriculture
USPS = U.S. Postal Service.

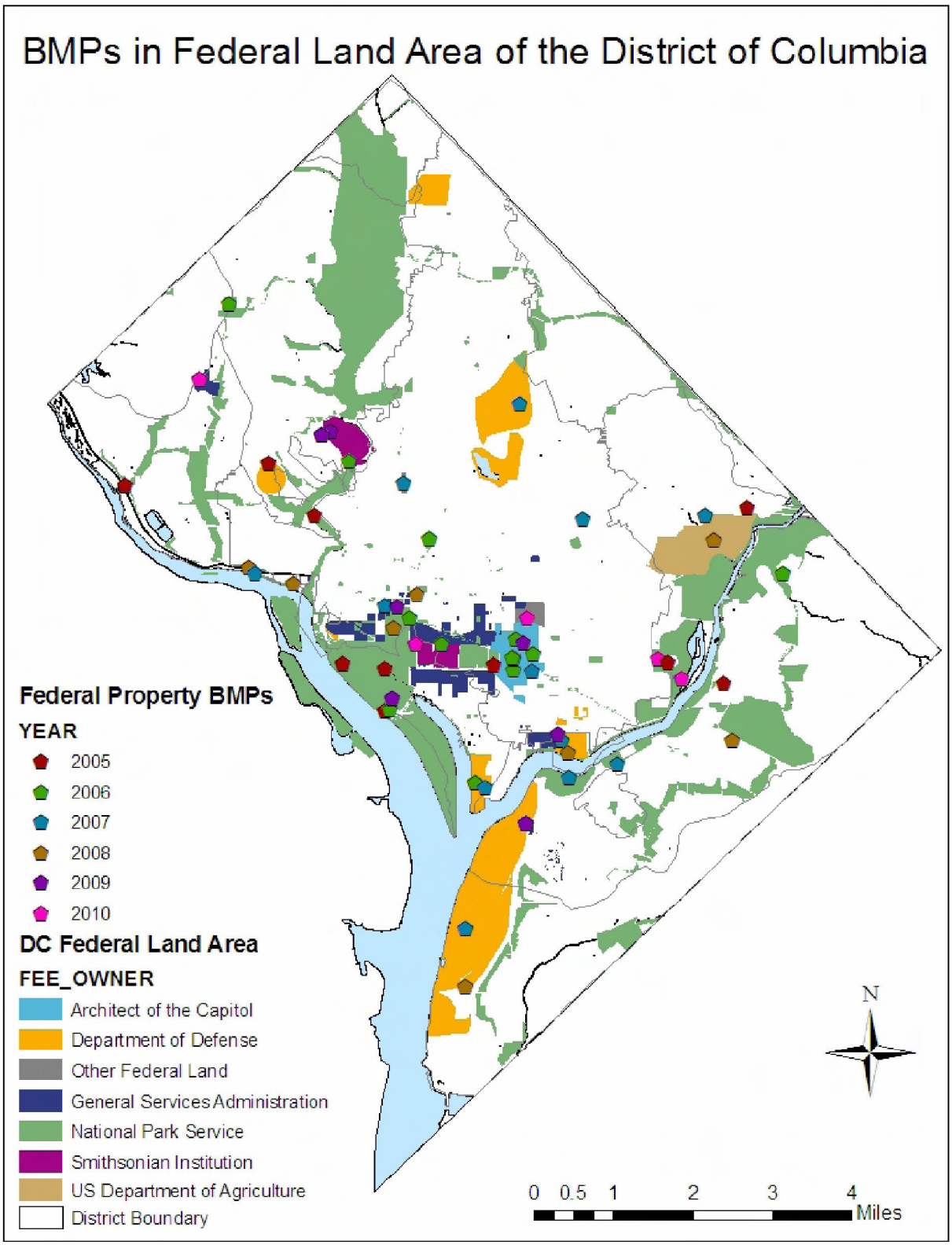

Figure 21. Location of stormwater BMPs installed on Federal Lands.

8 Education and Outreach

The DDOE Outreach and Community Education Program is within the Watershed Protection Division, Planning and Restoration Branch. The program is designed to work with local students, teachers and the general public to increase stakeholder awareness, encourage stewardship and educate about pollution prevention with the ultimate goal of reducing nonpoint source pollution. The District's youth are the program's primary audience and there is a close partnership between DDOE and the District of Columbia Public Schools (DCPS). As described in the 2004 Tributary Strategy, "the benefits of this strategy result not only from the fact that young people are still in the process of forming their belief and value systems, but also from the fact that children tend to have a profound influence on their parents' decisions, actions and habits. This influence is best demonstrated by the significant amounts of money that parents spend on items that are primarily marketed to children. DDOE not only attempts to educate children directly, but also indirectly, by training their teachers. Teacher training helps to institutionalize and reinforce the importance of environmental learning, stewardship and conservation (DC DOH 2004). There are a number of environmental education and outreach programs operated by DDOE, including:

Hands-On Environmental Learning

These programs include Meaningful Watershed Educational Experiences (MWEEs), which integrate field studies and classroom activities into a learning opportunity that is investigative, integrated within the instructional program, and sustained throughout the school year. The District committed to offering MWEEs through the Chesapeake Bay 2000 Agreement. To provide MWEEs, the DDOE partners with the Anacostia Watershed Society, Living Classrooms, Environmental Concerns, Earth Force and the Alice Ferguson Foundation. Some of the MWEE programs include: Watershed Wise DC Fellowships a three-year program for fourth-grade teachers to become knowledgeable about the Chesapeake Bay watershed and integrate watershed education into their classrooms; RiverSmart Schools, schoolyard greening projects that focus on landscape design principles to highlight water conservation and stormwater retention and filtration; Watershed and Farm Study, an overnight farm field trip that allows students to experience their local watershed and the natural environment; and Environmental Educational Camping, a program for elementary and middle school students to participate in an overnight camp experience and learn about the connection between local stream and the Chesapeake Bay.

Storm Drain Marking Program

The storm drain marking program is designed to raise awareness about non-point source pollution and the impacts of stormwater on the Chesapeake Bay and local rivers. DDOE has a goal of installing 1,000 storm drain markers annually.

Teacher Trainings – Project WET, WILD and Project Learning Tree (PLT)

Project WET, Project WILD and Project Learning Tree (PLT) are training programs for teachers and community educators working with students in pre-K through grade 12. DDOE offers the programs to provide teachers in the District with the tools necessary to help students develop environmental ethics and responsible stewardship through hands-on learning activities.

Anacostia River Environmental Fair

The Anacostia River Environmental Fair is an annual event organized by DDOE and held at Anacostia Park to celebrate the Anacostia River as a vital natural resource, while educating students about pollution prevention and the impact of trash on the river.

Environmental Education Resource Center for Teachers

DDOE makes full use of its Aquatic Resources Education Center to serve as a "one-stop-shop" for teachers and other environmental educators seeking high quality environmental education materials. There is also a resource center located at the offices of the DDOE Watershed Protection Division, where materials are loaned to teachers or students. Educators may browse, borrow materials for classroom use and take advantage of "give-away" items. Teachers can utilize up-to-date resource materials that promote interdisciplinary learning, reinforce science, math and reading skills, and adhere to the national education standards. Resources available for loan include: audio-visual materials, kits and books, lab equipment, curricula, maps, games, models, gardening tools and references.

DC Environmental Education Consortium (DCEEC)

The DCEEC is a non-governmental organization composed of over 20 environmental education groups which operate in the District. Membership includes the DDOE. The DCEEC provides "a communication network that enhances the abilities of its members to increase environmental knowledge and awareness in students, teachers and adults within the District" (DCEEC 2010). DCEEC provides networking opportunities, event coordination and facilitates professional development and education opportunities (DCEEC 2010).

9 Accounting for Growth

This section addresses Element 3: Accounting for Growth. EPA expects the states and the District to explain how growth estimates were derived and describe the pollution reductions necessary to offset anticipated growth and development. The District anticipates growth in population between 2010 and 2025, but does not expect significant new development on currently undeveloped lands. Because so much of the District is built out already, a greater rate of re-development is anticipated, rather than development.

9.1 Development & Growth

The District is unique in that there is very little new development in the city, due to space limitations and the current built out conditions. In general the undeveloped portions of the District are federally-owned parklands, which are unlikely to be developed in the future (such as the National Mall, etc.). Most development is redevelopment. In the case of redevelopment, the District is consistently moving from development with no stormwater controls to development with stormwater controls, allowing for reductions in loads of nutrients and sediment over pre-existing conditions. The District does not anticipate any increase in urban stormwater loading.

The District requires a construction permit for any land-disturbing activity of more than 50 square feet, including construction activities such as additions; demolition; construction of retaining walls, decks, fences, sheds, garages, and vaults; and erection of signs and awnings. Any activity that disturbs more than 50 sq ft of earth requires the development of an erosion and sediment control plan. Any land disturbance over 5,000 square feet requires a stormwater management plan. An erosion and sediment control plan describes the provisions (appropriate BMPs) for controlling erosion while land disturbing activities are underway and after activities are completed (DCMR Chapter 5 of Title 21). The WPD is informed of any project that requires BMPs. All construction in the District is required to comply with all stormwater regulations. Inspections ensure that compliance is met. DDOE maintains a database for tracking stormwater management facilities. This database is discussed further in Section 13.2. The new stormwater regulations that will be promulgated in the near future require development plans to control stormwater on-site with a focus on meeting the stormwater management requirements through LID and green infrastructure as a first choice.

Where the redevelopment is taking place in the MS4 area, stormwater runoff is being directly reduced. When stormwater controls are added to redevelopment areas in the MS4, benefit is most seen in the reduction of

sediment loading. The addition of stormwater controls lessens the amount of runoff, causing less channelization and bank erosion in streams. Stream erosion is a concern in the MS4 area.

Redevelopment that occurs in the CSS area effects flows into the Blue Plains wastewater treatment plant. The addition of stormwater controls to redevelopment areas lessens the amount of stormwater that enters the CSS. This reduction results in less flow in the CSS, less flow to Blue Plains and fewer combined sewer overflows.

9.2 Population Growth

In the fall of 2007, MWCOG released a report entitled Growth Trends to 2030: *Cooperative Forecasting in the Washington Region*. Population forecasts from this MWCOG report shows the population of DC in 2010 to be 601,100 and to rise to 703,700 in 2025 (MWCOG 2007). This is a 17% increase in population, marking an end to a previous period of short-term population loss (MWCOG 2007).

Blue Plains has a treatment design capacity of 370 MGD (million gallons per day). The District of Columbia Water and Sewer Authority anticipates this capacity will be reached in 2030, based on the projected regional population increases developed by MWCOG in 2008 (DC WASA 2010e). However, an increased proportion of the load may come from the District.

To accommodate potential growth and/or additional flows that the District may contribute to Blue Plains, the allocations to Blue Plains were increased by 178,795 lb total nitrogen, 7,294 lb total phosphorus and 181,313 lb total sediment (283,619 lb TSS). These additional loads are incorporated into the allocations for Blue Plains throughout this report The District will work with other jurisdictions to ensure any potential loading increases from growth in the District are properly addressed through the Intermunicipal Agreement (IMA). The consumption of loads allocated to growth can be tracked through the Blue Plains NPDES permit itself, as well as the required monitoring at the facility, including Discharge Monitoring Reports.

Because the 2025 loads for nitrogen, phosphorus and sediment are anticipated to be below their respective allocations, additional loads are available to the District and are accounted for in District Reserve Loads. The reserve loads are equal to the difference between the 2025 loads and the 2025 target allocations. The District may use the reserve for new or existing sources due to growth or other needs. The reserve load can also be traded with other jurisdictions.

9.3 Trading and Offsets

The District does not currently participate in any water quality trading programs. The District is not planning on participating in interjurisdictional trading at this time, though may be open to trading or offset "banking" in the future. The District does not at present have an established offset policy. The stormwater program within DDOE is currently in the preliminary stages of developing an offsets program that could be used to implement the District's MS4 permit. The District has reserved loading for increased point and nonpoint sources that should be sufficient to meet its nitrogen, phosphorous and sediment allocations through the timeframe of the Chesapeake Bay TMDL. This gives the District ample time beyond the implementation of the TMDL to look at offset and trading opportunities.

In addition, the District Reserve Loads are available should increased loading occur in the future. The District is not planning to use offsets to address increased loads from growth because a substantial portion of the nutrient and sediment loads are allocated to potential increases in the District's contribution to Blue Plains.

10 Gap Analysis

This section addresses Element 4: Gap Analysis. EPA expects the states and the District to identify the gaps between the current capacity and the capacity necessary to fully attain the interim and final nutrient and

sediment target loads. Table 25 summarizes the projected loads, the 2017 and 2025 target loads; there are no anticipated gaps between the current capacity to reduce nutrients and sediment and the required reductions. The 2017 interim targets and 2025 final targets will be met for all three constituents based on the current capacity of regulatory programs and the anticipated increase in on-site stormwater retention through the 1.2", 24-hour storm retention standard expected to take effect upon EPA's issuance of a new MS4 NPDES permit for the District. Figure 22 through Figure 24 illustrate the total loading in the District and a comparison with the target loads.

Table 25. Summary of current and projected loads and gaps between projected loads and allocations.

	TN (lb/yr)	TP (lb/yr)	TSS (tons/yr)
Current Load[1]	2,387,918	146,928	34,050,653
2017 Interim Target Load[2]	2,533,544	131,499	19,419,053
2017 Projected Load	2,223,060	130,286	14,877,654
Gap	Meets target	Meets target	Meets target
2025 Target Load	2,320,432	121,213	11,158,120
2025 Projected Load	2,232,934	109,139	11,069,250
Reserve Load	87,498	12,074	88,870
Gap	Meets target	Meets target	Meets target

[1]2009 Loads are based on the current capacities for TP and TSS in the permit limits.
[2]2017 interim target load and 2025 target load based on the CBPO Watershed Model allocations. 2017 interim target adjusted for current TP permit limits.

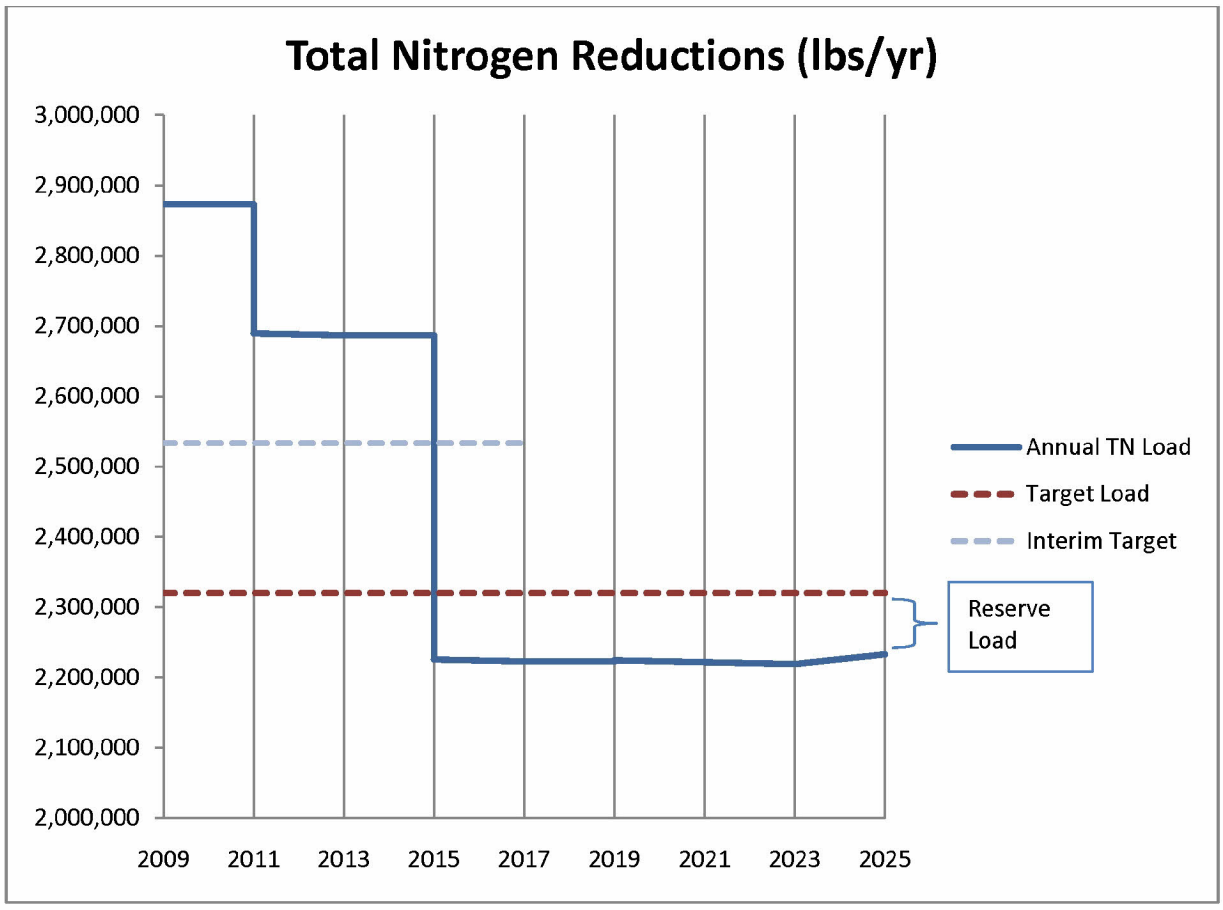

Figure 22. Total Nitrogen Reductions and Comparison to Target Loads.

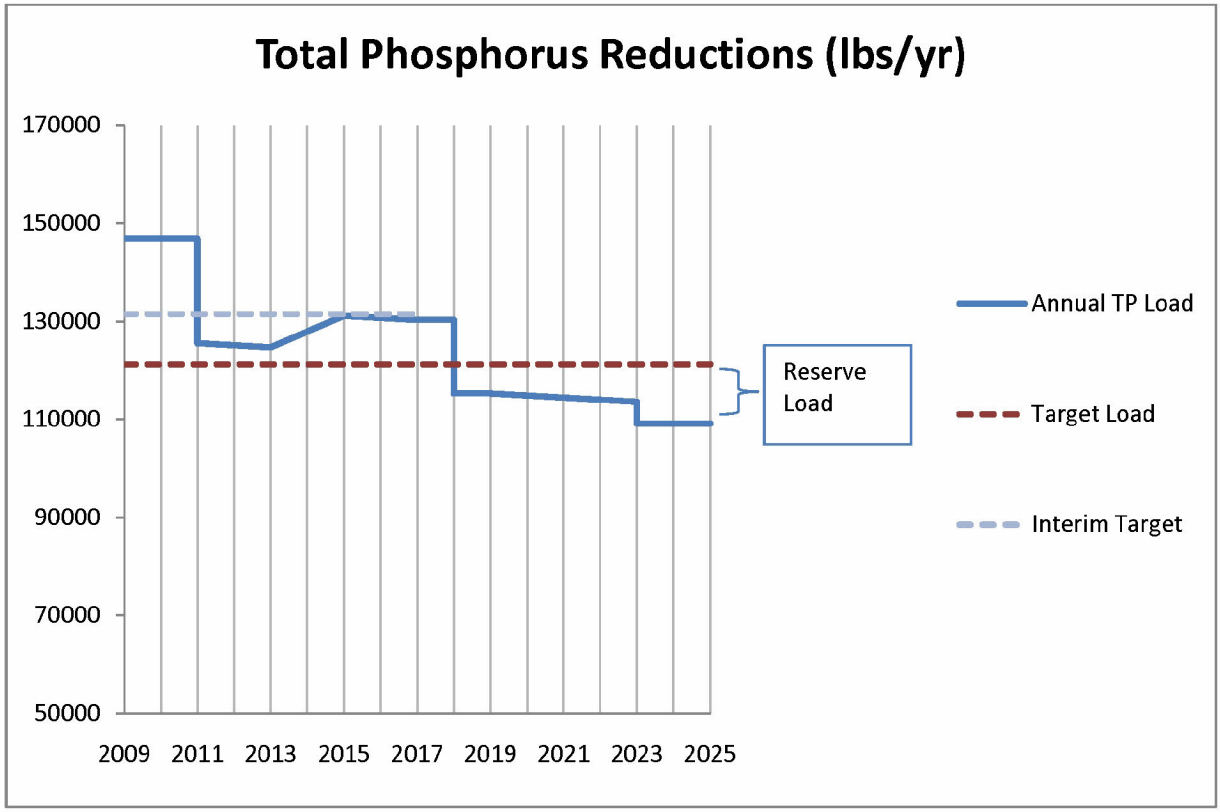

Figure 23. Total Phosphorus Reductions and Comparison to Target Loads.

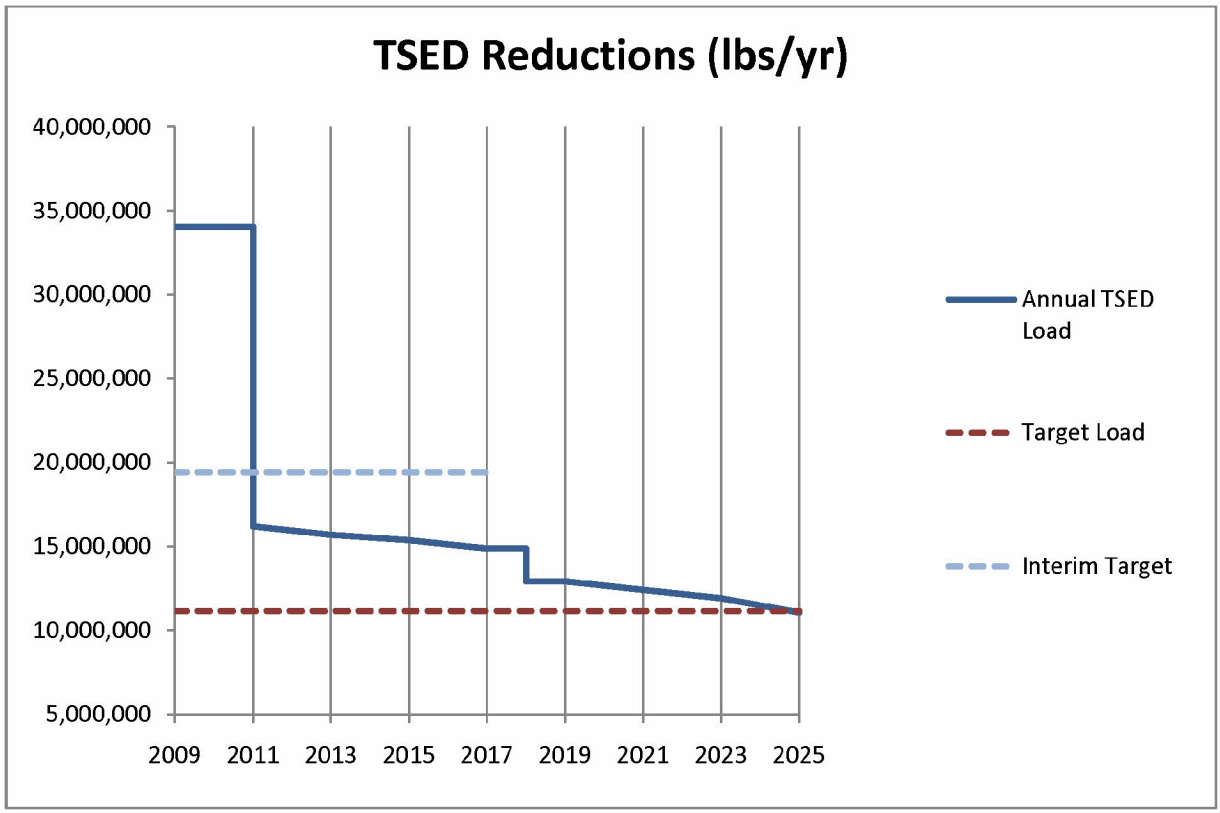

Figure 24. Total Suspended Solids Reductions and Comparison to Target Loads.

10.1 Point Sources

Because the planned upgrades to the Blue Plains Wastewater Treatment Plant and improvements to the CSS system through the LTCP are anticipated to be sufficient to comply with the 2017 interim and 2025 target loads, additional implementation beyond the current capacity is not required. Implementation of the LTCP is anticipated to cost $2.7 billion (DC WASA 2009). The Blue Plains ENR upgrade for wastewater at Outfall 002 is expected to cost $977 million (DC WASA 2010d). DC WASA's Impervious Area Charge funds a portion of the cost of the CSO Long Term Control Plan. The upgrades to Blue Plains and the CSS are required by the permit and consent decree, so implementation must occur. DC WASA and the District will work with federal partners and EPA to obtain additional resources to implement the upgrades to Blue Plains Outfalls 001 and 002 and the CSS outfall reductions. DC WASA continues to work to obtain the necessary funds for all of its required work, including Long Term Control Plan and ENR and BNR. Funding remains an issue over time.

The upgrades to the Washington Aqueduct are well underway and are anticipated to be completed and operational by 2011. This project is fully funded at $96 million and is anticipated to nearly eliminate a significant source of sediments to the Potomac River. Sediment from this facility will be reduced by over 99 percent.

To ensure that point sources are meeting their permit requirements, the District is working with EPA to enhance regulatory and enforcement activities. Specifically, the District is working to increase inspections at multi-sector facilities covered under the industrial stormwater general permit. The District and EPA are working to ensure these facilities develop Stormwater Pollution Prevention (SWPP) plans.

10.2 Regulated and Unregulated Nonpoint Sources

Assumptions were made that nonpoint source BMP implementation rates in the MS4 and other areas outside of the CSO will continue at a constant average annual rate from 2010 through 2025. This average annual rate was based on the implementation of BMPs, such as stream restoration, tree planting, and street sweeping; erosion and sediment control regulations; and the anticipated 1.2", 24-hour storm retention standard on newly developed and redeveloped properties.

DDOE projects that the rate of implementation might remain constant, assuming steady programmatic funding, stormwater fees and staffing levels at the DDOE remain relatively constant, it cannot foresee if there will be gaps in the staffing, technical resources, outreach or funding to achieve the projected implementation rates for BMPs in the MS4 area. Nutrient and sediment reductions from the MS4 area will be completed through the forthcoming permit (issued by EPA), which is likely to contain aggressive and specific implementation requirements. The District's MS4 stormwater fees provide funding for activities outlined in the Letter of Agreement/MS4 permit. DDOE moves forward under the assumption that these funds will only be sufficient to fund nonpoint source nutrient and sediment reduction implementation activities in the MS4 area if the federal partners resume payment of the District's Stormwater fee. As noted in the acknowledgements, this non-payment issue is currently unresolved and loss of revenue from non-payment would significantly diminish these stormwater management programs and activities. DDOE hopes for a resolution very soon and will reflect this any change in the Phase II WIP.

11 Commitment and Strategy to Fill Gaps

This section addresses Element 5: Commitment and Strategy to Fill Gaps. EPA expects that a strategy will be developed to systematically fill the gaps identified in Element 4 (USEPA 2009a). The commitment to fill gaps should include new or enhanced policies, programs, authorities, and/or regulations.

Almost the entire land area of the District is permitted under NPDES, so very little additional assurance is needed that nutrient reductions will be met. Refer to Section 7.1 and Section 7.3 for a summary of the

anticipated loading reductions from point sources. Blue Plains is under a consent decree to reduce loading, and the Washington Aqueduct is required by a Federal Facilities Compliance Agreement to meet the TSS permit limits.

Although load reductions primarily from point sources will achieve the 2025 target loads for total nitrogen and total phosphorus, reductions in the sediment load will rely more heavily on nonpoint source implementation activities. The mandated Washington Aqueduct upgrades are anticipated to reduce sediment loads by 99 percent from that facility. While reductions in sediment loading from the Washington Aqueduct Dalecarlia facility are sufficient to meet the 2017 Interim Target Loads, they are not sufficient to meet the District's 2025 target load on their own. Sediment loads will be met through the anticipated 1.2 inch city-wide retention standard in the upcoming MS4 permit.

As has been previously discussed, stream restoration is the key to dramatically reducing sediment loads to the Potomac and Anacostia rivers, but significant portions of Rock Creek and the Anacostia and Potomac rivers run through National Park Service properties. Additionally, Joint Base Anacostia-Bolling is located directly on the Potomac and Anacostia Rivers. The District must work with the Federal facilities in order to achieve significant sediment reductions, as most of the land within the "Others" category is owned by the National Park Service or the Department of Defense. Indeed, the District cannot guarantee what its federal partners will do in the end, making long term commitments not viable. The District will also work to implement additional stream restorations along portions of the rivers and tributaries that are not federally-owned. Some of these restorations have already begun or are planned as part of the required TMDL implementation plan for the Anacostia River TMDL for sediment/total suspended solids. Restoration activities already occurring along the rivers and tributaries are discussed in Section 7.4.2.

The District will continue working with federal facilities to help them meet the requirements of EISA and comply with the proposed stormwater regulations when they take effect. Permit conditions and the Chesapeake Bay TMDL will drive federal facilities to meet the requirements of EISA, which will in turn, drive federal facilities to make nutrient and sediment reductions. A pilot project is underway to survey the federal agencies owning land in the District, to determine their current progress in implementing stormwater BMPs and develop a mechanism for the agencies to report their future progress in implementing EISA requirements. The projects implemented and planned by the federal agencies are summarized in Section 7.5.2.1. In addition to EISA stormwater requirements, the forthcoming District MS4 permit and stormwater regulations outline specific stormwater management requirements for the federal facilities. These requirements are summarized in Section 7.2.2.4.

Several regulatory and programmatic elements are in development that will continue to reduce the volume of stormwater beyond the current amount and improve the quality of the stormwater that is not eliminated.

DDOE is in the process of promulgating revised stormwater regulations, as described in section 7.2.2.6. The aim of the revised stormwater regulations is to restore and protect the District's streams and rivers. To this end, the revised regulations (when finalized and issued) will reflect a change in the District's approach to stormwater management that parallels the most recent scientific findings, the direction of the Federal EPA, and the actions of surrounding jurisdictions. The changes aim to encourage better stormwater management through low impact development practices and stormwater re-use. Earlier research focused on controlling the rate of stormwater runoff says that preventing runoff is the best way to preserve and restore our streams and rivers and avoid over burdening the public infrastructure. Therefore, the District is proposing an on-site retention standard for all development and redevelopment that disturbs more than 5,000 square feet of land.

This green infrastructure is exemplified by practices and technologies that prevent runoff by encouraging evapo-transpiration, infiltration and the capture and use of stormwater by buildings. They include site conservation and tree planting as well as green roofs and green walls, rain gardens, porous pavement, rain barrels and cisterns and treatment trains of all of the above.

This does not negate the innovative best management practices of five or ten years ago such as sand filters or water quality catch basins. The new regulations do not preclude the use of these and other more traditional practices. Rather, the new regulations will recognize the built-out conditions of the District, and so will encourage and require green practices to the maximum extent practicable; the more traditional piped BMPs are a second tier of choices and when on-site practices are found to be too technically difficult to implement the new regulations will offer a fee in-lieu approach.

The revised regulations come after public comments were received on a previous release of an earlier version of the regulations that included both development and environmental interests within the District. A combination of their comments along with a rapidly changing policy landscape – most notably: guidance on the federal EISA stormwater requirements for federal facilities, the District's draft MS4 permit, increased federal focus on the Chesapeake Bay recovery efforts, and the more stringent MS4 permits in surrounding jurisdictions – will lead DDOE to carefully tailor the stormwater regulations prior to formal promulgation.

Following promulgation of the stormwater and erosion and sediment control regulations, the Erosion and Sediment Control Handbook will be updated to reflect the new regulatory requirements. Similarly, it is anticipated that the Construction Code will be overhauled to reflect the new stormwater regulations as well.

12 Contingencies

This section addresses Element 7: Contingencies for Slow or Incomplete Implementation. EPA expects the District's WIP to provide alternative measures that will result in equivalent reductions if the strategies outlined in Element 4 are not implemented (USEPA 2009a).

Most implementation actions in the District are regulatory requirements with specific deadlines for completion. There is very little in the way of voluntary actions (except for federal agency cooperation) that would be required to meet the nutrient target loads. The District is unclear that stormwater fees will generate sufficient funding to implement the upcoming MS4 permit requirements. District funding confidence is tempered since it is unknown until the new 2010 permit is issued. Only when the permit is officially issued can we make plans for its implementation and compliance. Until the permit is formally issued DC cannot guarantee adequate funding. Funding issues also hinge on the federal governments decisions to pay DDOE's stormwater fee. The forthcoming draft MS4 permit will likely require the development of and compliance with Anacostia and Potomac River Implementation Plans following the development of relevant TMDLs. Additionally, the District is in the advanced stage of adopting new requirements for development/redevelopment through the revised stormwater management and erosion and sediment control regulations.

DC WASA is constantly seeking funding opportunities to help fund their LTCP and ENR projects. The projects cannot be funded through Blue Plains rate payers alone.

Although there are many regulatory requirements and timelines to upgrade the significant point source dischargers, it is not within the District's power to supply or acquire funding for point source dischargers and therefore cannot anticipate delays of implementation based on funding.

Voluntary/Incentive-Based Programs

The District is not relying heavily on voluntary or incentive-based programs to meet the nutrient target loads. Most implementation activities within the District are mandated through permits requirements, including nonpoint source implementation activities, through the MS4 permit and Letter of Agreement.

Meeting the sediment allocation targets will rely heavily on reductions from nonpoint source areas. The District is relying on efforts by the federal facilities to make additional reductions in sediment. The District needs commitments from federal facilities to implement BMPs, LIDs and retrofits on their properties to control

stormwater runoff. In particular, the District needs the federal facilities to plant trees and install regenerative stormwater conveyances.

The RiverSmart Homes program, described in Section 7.2.2.7, is an incentive program funded through the America Recovery and Reinvestment Act. The District is promoting the program District-wide and will provide up to $1,200 per household for landscape improvements to reduce nonpoint source pollution.

Changes in Land Use and Development Rates

The Blue Plains Wastewater Treatment Facility is designed with a treatment capacity sufficient to treat the increased load from anticipated population increases through 2030. However, if additional capacity is required, this WIP has included an allocation for growth to be specifically applied to the Blue Plains wastewater load. This should be sufficient to cover any unexpected population increases over the next 16 years.

The District is predominantly built out. The vast majority of development is in-fill on abandoned lots or redevelopment of existing properties. Given that most of existing properties in the District do not have stormwater controls, redevelopment and in-fill will lessen the stormwater load and improve its quality because current construction regulations require stormwater management. If the rate of development increases, the rate of improvements in stormwater will increase. If development rates decrease, no change in stormwater loads is anticipated. Most of the undeveloped, pervious lands in the District are National Park Service properties, making it highly unlikely that undeveloped lands will be converted to impervious surfaces, which would increase stormwater runoff.

13 Tracking and Reporting Protocols

This section addresses Element 6: Tracking and Reporting Protocols. EPA expects the WIP to include the description of "efforts currently underway or planned to improve transparent and consistent monitoring, track and reporting and assess the effectiveness of implementation actions" (USEPA 2009a).

The District is developing a data node to be a part of the EPA's National Environmental Information Exchange Network (NEIEN). The data node will automatically capture and send data to the EPA for the majority of BMPs installed in the District. The data will come directly from the Planning Review Database and will include final construction inspections. Although the progress reporting includes practices and programs that follow EPA-approved definitions of BMPs used in Scenario Builder and the Watershed Model, other practices and programs can be reported as well, following the reporting requirements in the appropriate permits. The data node will be operational by December 2010 to be used for the yearly Chesapeake Bay Program submissions.

The District understands that EPA is working to establish electronic reporting of DMRs that will facilitate a direct linkage to the NEIEN. DMRs will serve as the primary tracking and reporting mechanism for point source nutrient and sediment load reductions. The submission of DMRs is part of the permit requirements for Blue Plains, the MS4 system and the Washington Aqueduct. All NPDES permitted facilities report with standard EPA forms.

Participation in the 319 Clean Water Act Program allows for tracking of stream restoration projects in the District that are not reported under the permit requirements of the MS4 program. 319 projects are tracked separately and reported to the Chesapeake Bay Program.

Wetland mitigation projects are required to have a covenant placed in the deed to protect the wetland in perpetuity. Inspections are also conducted after completion to ensure the project meets mitigation requirements.

13.1 DC WASA Reporting Requirements

Monitoring results from Blue Plains are required to be submitted to EPA and the District through DMRs on a monthly basis.

As a requirement of the DC WASA Consent Decree, quarterly status reports must be submitted to U.S. EPA until the Consent Decree terminates. The status reports must include (US District Court 2005):

- identification of deadlines DC WASA is required to meet since the last quarterly statement, and whether and to what extent those requirements were met, and the reasons for noncompliance
- statement tracking DC WASA's progress against the detailed implementation schedules upon completion of Facility Planning for each receiving water, any delays, reasons for the delays and action DC WASA is taking or intends to take to overcome the delays.
- Description of the work completed within the quarter and a projection of work for the next quarter.

Among other requirements, the Consent Decree will not terminate until the following have occurred (US District Court 2005):

- DC WASA has place in operation all required construction projects
- DC WASA has demonstrated that it has achieved and maintained compliance with the water quality based CSO numerical effluent limitations and performance standards requiring the selected CSO controls be implemented, operated and maintained as described in the NPDES permit for two years after the selected CSO Controls are placed in operations

13.2 Assessing the Effectiveness of the SWMP and Loading in the MS4 area

The draft MS4 permit requires the development of a revised monitoring plan after the effective date of the permit. The monitoring plan must be designed to estimate the annual cumulative pollutant loadings for several parameters, including TN, TP and TSS (EPA 2010). These loadings will be reported in the DMRs, which are submitted to EPA and in the updates to the TMDL Implementation Plans (EPA 2010).

Under the current MS4 permit, the District implements a stormwater monitoring program designed to estimate annual cumulative pollutant loadings for several parameters including TN, TP, and TSS (EPA 2004). The District is required to submit monitoring results in an annual Discharge Monitoring Report (DMR) to the EPA Region III Water Protection Division (EPA 2004). Included in the DMRs are estimates for pollutant loadings calculated using the Simple Method. The Simple Method takes Event Mean Concentrations (EMCs), total area and land use distribution within each sewershed into account (DDOE 2009a). The pollutant reduction model developed by DDOE will assist in estimating the pollutant load reductions of TSS, TN, TP, fecal coliform and metals, based on the level of implementation of BMPs and their efficiencies Efficiencies in the model were determined through literature review and District-specific studies (DDOE 2009a).

DDOE investigates illicit discharges and enforces the District water quality regulations. During FY 2009, DDOE personnel conducted a total of 385 inspections and investigations. This number includes illicit discharge investigations, emergency response, outfall inspections, and targeted facility inspections (DDOE 2009b).

DDOE WQD has devoted significant effort to revamping its illicit connection inspection and enforcement program. The Permit states that the District will use a mix of strategies for the detection and elimination of illicit discharges. DDOE has developed a complete schedule of inspections for both MS4 facilities and outfalls. The facility inspection schedule ensures that all auto repair, laundry, car wash, and dry cleaning facilities will be inspected within a 5 year period. Additionally, over 500 facilities of various other categories have been added to the inspection list (DDOE 2010d).

DDOE also continues visual inspection of MS4 outfalls to detect illicit discharges. Each outfall has been mapped in ArcGIS and ranked as high, medium, or low priority in accordance with size, land use, and historical

knowledge of the outfall drainage basin. Outfalls are inspected every 6 months, 2 years, or 5 years for high, medium, and low priority outfalls, respectively, in order to complete all outfall inspections within a 5 year period. DDOE continues to assess and update the outfall prioritization database as a result of scheduled inspections (DDOE 2010d).

This protocol targets facility inspection areas that show high frequencies of detection and quantities of pollutants. It describes a stepped process by which inspectors will prioritize the District's water bodies according to level of impairment, correlate the pollutants to broad categories of potential sources, locate individual businesses that fall under the identified sources, plan compliance inspections for these facilities, and resolve compliance issues (DDOE 2010d).

Construction Project Stormwater Management Tracking

The DDOE maintains a "Plan Review Database" that contains a record of all construction projects that disturb over 5,000 sq ft and are required to implement stormwater pollution controls. The Watershed Protection Division, Inspection and Enforcement Branch in DDOE is responsible for conducting inspections of all soil erosion and sediment control and stormwater management facilities at construction sites. During the construction process, compliance inspections are conducted, followed by a final inspection upon the completion of construction. Figure 25 summarizes the number of stormwater management and erosion and sediment control construction plans reviewed and approved. Figure 26 illustrates the number of inspections conducted annually for compliance with erosion and sediment control and stormwater management requirements at construction sites.

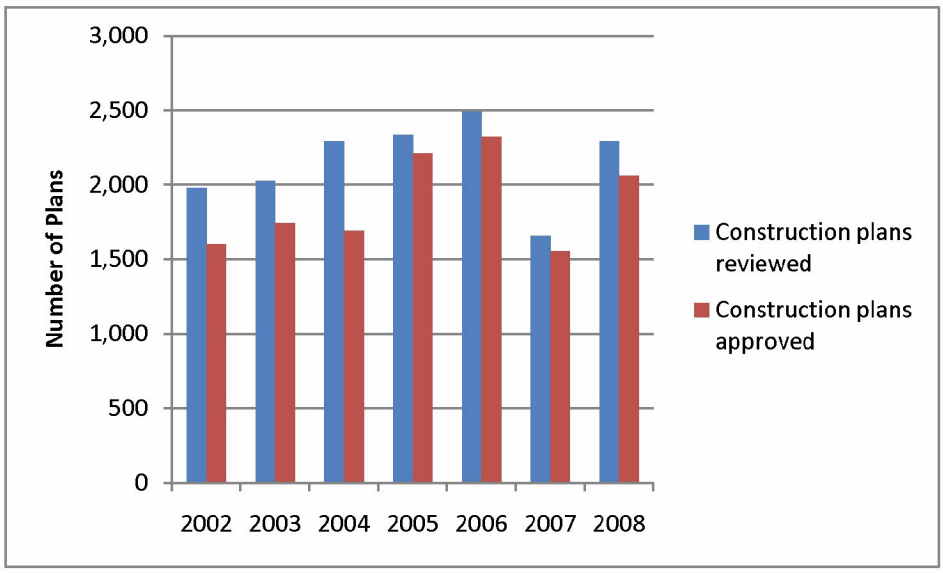

Figure 25. Stormwater and Erosion and Sediment Control Plans Review and Approved.

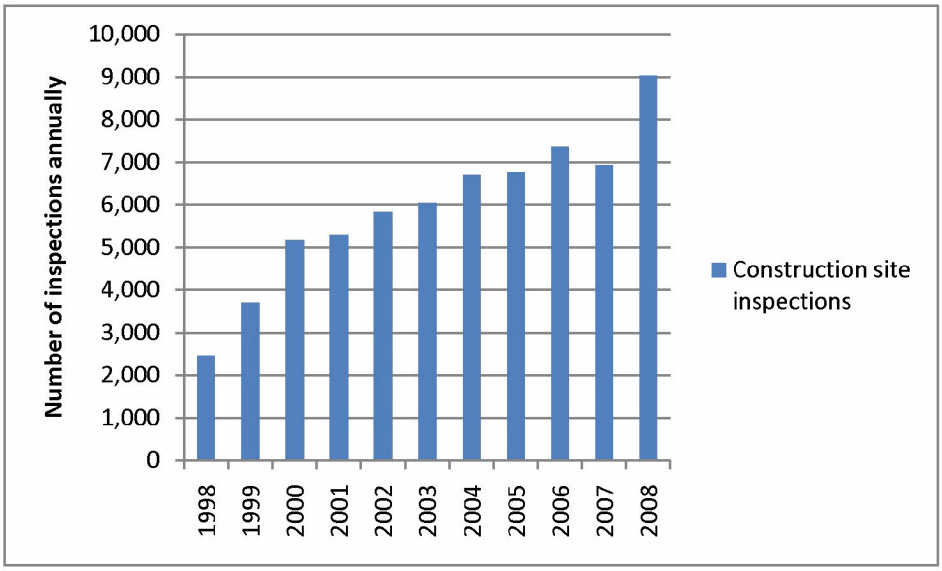

Figure 26. Number of erosions and sediment control and stormwater management construction site inspections.

Property owners with stormwater management facilities/BMPs are required to "maintain the facility in good condition, and promptly repair and restore whenever necessary all grade surfaces, walls, drains, structures, vegetation, erosion and sediment control measures, and other protective devices" (DCMR Title 21 Chapter 5). A maintenance schedule is required to be submitted as part of the property stormwater management plan and a covenant stating the owner's maintenance responsibilities is recorded with the property deed (DCMR Title 21 Chapter 5). The Watershed Protection Division, Inspection and Enforcement Branch conducts maintenance inspections of all stormwater management facilities twice a year during the first five years of operation and at least once every two years thereafter, to ensure completion of scheduled maintenance and servicing of the stormwater management facilities (DDOE 2003).

If a facility is found to be in violation of stormwater management and erosion and sediment control regulations, including requiring maintenance after an inspection, a notice of violation (NOV) is sent to the property owner or responsible party. If notification is insufficient to correct the violation, "failure or refusal to maintain a stormwater management facility in proper condition shall result in corrective action by the Department" and "any violator may be fined in accordance with [Title 21 Chapter 5]" (DCMR Title 21 Chapter 5). Beyond an NOV, a notice of infraction (NOI), which is a civil infraction ticket with a fine, or a Stop of Work Order (SWO) can be issued (DDOE 2009a). Figure 27 summarizes the number of inspections DDOE conducted at stormwater management facilities over the last several years. The data are aggregated to include initial inspections and maintenance inspections. Prior to 2004 maintenance inspections were either not performed or not recorded. Figure 28 summarizes the total number of enforcement actions taken for both construction site erosion and sediment control/stormwater management violations and stormwater BMP maintenance violations.

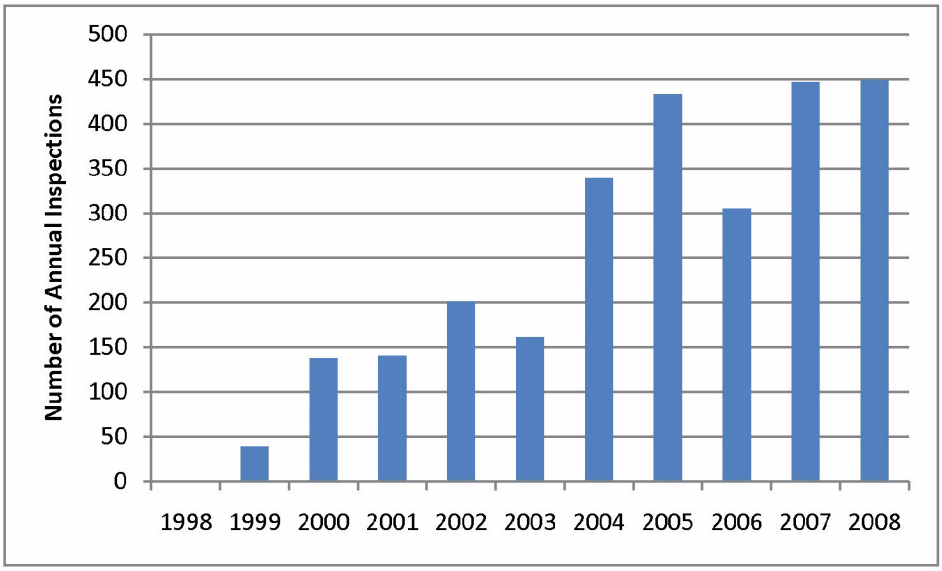

Figure 27. Total number of inspections at stormwater management facilities (BMPs)

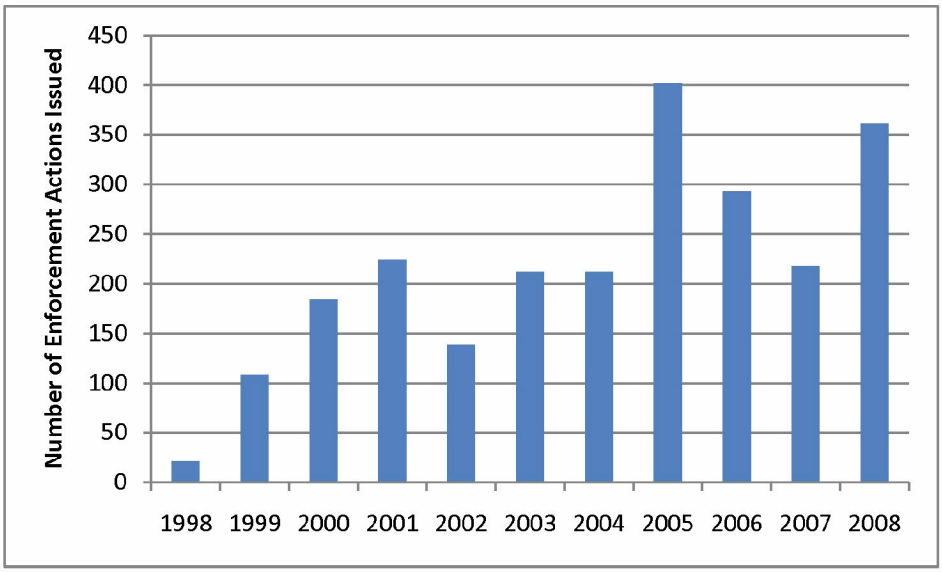

Figure 28. Total number of construction site and stormwater management BMP maintenance enforcement actions.

The Plan Review Database, in addition to ensuring compliance with regulations, serves as a tracking and reporting system to protect against double-counting of control measures and ensuring that practices reported as new did not previously exist.

14 References

American Water Resources Association (AWRA), 2009. Implementing Regenerative Storm Conveyance Restoration Techniques in Anne Arundel County: An Innovative Approach to Stormwater Management. Water Resources IMPACT. Volume 11, Number 5, September 2009, p 5-7.

Anacostia Watershed Restoration Partnership (AWRP). 2010. Anacostia River Watershed Restoration Plan and Report. Final Draft.

Chesapeake Executive Council. 1987. 1987 Chesapeake Bay Agreement.

Chesapeake Bay Program Office (CBPO). 2010. Watershed Model Phase 5.3. 2009 Progress Scenario. U.S. Environmental Protection Agency.

District of Columbia Department of the Environment (DDOE). 2003. Stormwater Guidebook.

District of Columbia Department of the Environment (DDOE). 2007. MS4 Letter Agreement, dated November 27, 2007. Re: NPDES Permit No. DC0000221, District of Columbia Municipal Separate Storm Sewer System (MS4) Best Management Practices Enhancement Package.

District of Columbia Department of the Environment (DDOE). 2009a. Upgraded Stormwater Management Plan. Submitted on Behalf of the District Department of the Environment, DC Department of Public Works, Office of Property Management and the District Department of Transportation.

District of Columbia Department of the Environment (DDOE). 2009b. Municipal Separate Storm Sewer System NPDES Permit No. DC0000221 Annual Report. Submitted on behalf of DDOE, DDOT, DPW, and DC Water and Sewer Authority.

District of Columbia Department of the Environment (DDOE). 2010a. *Watershed Protection Division, Planning and Restoration Branch*. http://ddoe.dc.gov/ddoe/cwp/view,a,1209,q,494847.asp. Accessed July 30, 2010.

District of Columbia Department of the Environment (DDOE). 2010b. Changes to the District's Stormwater Fee. http://ddoe.dc.gov/ddoe/cwp/view,a,1209,q,498382.asp. Accessed July 30, 2010.

District Department of the Environment (DDOE). 2010c. Municipal Separate Storm Sewer System NPDES Permit No. DC0000221 Annual Report. Submitted on behalf of DDOE, DDOT, DPW, DC WASA and DRES.

District Department of the Environment (DDOE). 2010d. Fiscal Year 2011 Implementation Plan. Municipal Separate Storm Sewer System NPDES Permit No. DC0000221. Submitted on behalf of DDOE, DDOT, DPW, DC WASA and DRES.

District of Columbia Department of Health (DC DOH). 2004. The District of Columbia 2004 Nutrient and Sediment Tributary Strategy. District of Columbia Department of Health, Environmental Health Administration.

District of Columbia Code of Municipal Regulations. Title 21, Chapter 5 Water Quality and Pollution.

District of Columbia Environmental Education Consortium. 2010. *DC Environmental Education Consortium*. http://www.dcnaturally.org/cgi-bin/dceec.cgi?page=home. Accessed August 15, 2010.

District of Columbia Water and Sewer Authority (DC WASA). 2002. Combined Sewer System Long Term Control Plan Final Report. Prepared by Greeley and Hansen LLC. For DC WASA.

District of Columbia Water and Sewer Authority (DC WASA). 2007. Blue Plains Total Nitrogen Removal/ Wet Weather Plan, Long Term Control Plan Supplement No. 1. Washington, D.C.

District of Columbia Water and Sewer Authority (DC WASA). 2009. 2009 Annual Report.

District of Columbia Water and Sewer Authority (DC WASA). 2010a. Combined Sewer System. http://www.dcwater.com/wastewater_collection/css/default.cfm. Accessed August 6, 2010.

District of Columbia Water and Sewer Authority (DC WASA). 2010b. Long Term Control Plan Consent Decree Status Report: Quarter No. 2 – 2010.

District of Columbia Water and Sewer Authority (DC WASA). 2010c. Rates and Metering. http://www.dcwasa.com/customercare/rates.cfm. Accessed July 30, 2010.

District of Columbia Water and Sewer Authority (DC WASA). 2010d. Budget in Brief – Revised FY2010 and Approved FY 2011.

District of Columbia Water and Sewer Authority (DC WASA). 2010e. *Nitrogen Reduction Program*. http://www.dcwater.com/education/nitrogen_reduction.cfm. Accessed July 30, 2010.

District of Columbia Water and Sewer Authority. (DC WASA) 2010f. Capital Improvement Program Approved FY 2009-2018.

Johnson, Peter. A. 2008. Green Roof Performance Measures – A Review of Stormwater Management Data and Research. Chesapeake Bay Foundation – Anacostia River Initiative.

Maryland Department of the Environment (MDE) and District Department of the Environment (DDOE). 2007. Total Maximum Daily Loads of Sediment/Total Suspended Solids for the Anacostia River Basin, Montgomery and Prince George's Counties, Maryland and the District of Columbia.

Metropolitan Washington Council of Governments (MWCOG). 2007. Growth Trends in 2030: Cooperative Forecasting in the Washington Region.

Siddique, M. 2010, July 26. Email from Mohsin Siddique, DC WASA to Monir Chowdhury, DDOE, regarding Blue Plains ENR schedule.

United States District Court for the District of Columbia. 2005. Consent Decree. Anacostia Watershed Society, et al. v. District of Columbia Water and Sewer Authority, et al. and The United States v. District of Columbia Water and Sewer Authority and the District of Columbia. Consolidated Civil Action No. 1:CV00183TFH. March 25, 2005.

United State Army Corps of Engineers (USACE). 2005. Final Environmental Impact Statement for a Proposed Water Treatment Residuals Management Process for the Washington Aqueduct, Washington, D.C. Executive Summary.

United State Army Corps of Engineers (USACE). 2010. Request for Modification of Federal Facilities Compliance Agreement Timetable Item. May 24, 2010 Letter from U.S. Army Corps of Engineers to USPEA Region III.

U.S. Environmental Protection Agency (USEPA). 2003. Federal Facility Compliance Agreement. Department of the Army and the Army Corps of Engineers, Respondent, Washington Aqueduct, Facility. Docket No. CWA-03-2003-0136DN.

U.S. Environmental Protection Agency (USEPA). 2004. Authorization to Discharge under the National Pollutant Discharge Elimination System Municipal Separate Stormwater System Permit No. DC0000221, Washington, DC.

U.S. Environmental Protection Agency (USEPA). 2007. Final Fact Sheet, NPDES Permit Modification, District of Columbia Water and Sewer Authority Wastewater Treatment Plant at Blue Plains, Washington, DC.

U.S. Environmental Protection Agency (USEPA). 2008. Fact Sheet, NPDES Permit Reissuance, Washington Aqueduct Water Treatment Plant, Washington, DC.

U.S. Environmental Protection Agency (USEPA). 2009a. Watershed Implementation Plan Expectations Letter to the States and District. William C. Early, Action Regional Administrator, USEPA Region 3 to Bay States and Jurisdictions.

U.S. Environmental Protection Agency (USEPA). 2009b. Clean Water Act Section 303(d): Preliminary Notice of Total Maximum Daily Load (TMDL) Development for the Chesapeake Bay. U.S. Environmental Protection Agency, Region 3, Water Protection Division. Federal Register. September 17, 2009, 74:47794.

U.S. Environmental Protection Agency (USEPA). 2009c. Draft NPDES Permit DC0021199 DC WASA Waste Water Treatment Facility at Blue Plains and Associated Combined Sewer System Collection System.

U.S. Environmental Protection Agency (USEPA). 2010a. Draft Chesapeake Bay Total Maximum Daily Load. USEPA Region 3, Chesapeake Bay Program Office and USEPA Region2, in coordination with USEPA Office of Water and the States of Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia and the District of Columbia.

U.S. Environmental Protection Agency (USEPA). 2010b. Draft NPDES Permit No. DC0000221, dated April 19, 2010.

U.S. Environmental Protection Agency (USEPA). 2010c. Draft Fact Sheet for NPDES Draft Permit No. DC0000221, dated April 19, 2010.

U.S. Environmental Protection Agency (USEPA). 2010d. NPDES Permit No. DC0000221, dated September 30, 2010

Appendix A

Table B2 breakdown of loads by segment-shed and source sector as required by Element 8

Table B2: Total Nitrogen Allocation and 2-Year Milestones

St.	Maj. Basin	Impaired Segment Drainage	Source Sector	Type	NPDES Permit	2010 Ac.	2009 Load [1]	2011	2013	2015	2017 Interim Target	2019	2021	2023	2025 Final Target/ TMDL
DC	Potomac	ANATF_DC	Wastewater: POTW	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	ANATF_DC	CSO/ Stormwater	Ind. WLA	DC0021199	278	67,502	67,502	67,502	67,502	67,502	1,223	1,223	1,223	1,223
DC	Potomac	ANATF_DC	**Total Sig Municipal**				67,502	67,502	67,502	67,502	67,502	1,223	1,223	1,223	1,223
DC	Potomac	ANATF_DC	Wastewater: Non-sig Indus	Agg. WLA	DC0000094, DC0000035 DC0000141 DC000345		3,286	3,286	3,286	3,286	3,286	3,286	3,286	3,286	3,286
DC	Potomac	ANATF_DC	**Subtotal: Wastewater**				70,788	70,788	70,788	70,788	70,788	4,509	4,509	4,509	4,509
DC	Potomac	ANATF_DC	Urb/Suburb Runoff: MS4	Ind. WLA	DC0000221	8,188	47,130	46,429	45,727	45,026	44,324	43,623	42,921	42,220	41,517
DC	Potomac	ANATF_DC	Urb/Suburb Runoff: Non-MS4	LA		2,531	14,573	14,163	13,753	13,343	12,933	12,523	12,113	11,703	11,293
DC	Potomac	ANATF_DC	**Subtotal: Urb/Suburb**				61,703	60,592	59,480	58,369	57,257	56,146	55,034	53,923	52,810
DC	**Potomac**	**ANATF_DC**	**Total**				**132,491**	**131,380**	**130,268**	**129,157**	**128,045**	**60,655**	**59,543**	**58,432**	**57,320**
DC	Potomac	ANATF_MD	Wastewater: POTW	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	ANATF_MD	CSO/ Stormwater	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	ANATF_MD	**Total Sig Municipal**				0	0	0	0	0	0	0	0	0
DC	Potomac	ANATF_MD	Wastewater: Non-sig Indus	Agg. WLA	DC0000175		2,361	2,361	2,361	2,361	2,361	2,361	2,361	2,361	2,361
DC	Potomac	ANATF_MD	**Subtotal: Wastewater**				2,361	2,361	2,361	2,361	2,361	2,361	2,361	2,361	2,361
DC	Potomac	ANATF_MD	Urb/Suburb Runoff: MS4	Ind. WLA	DC0000221	1,772	12,617	12,343	12,069	11,794	11,520	11,246	10,972	10,697	10,424
DC	Potomac	ANATF_MD	Urb/Suburb Runoff: Non-MS4	LA		110	786	765	744	722	701	680	659	637	616
DC	Potomac	ANATF_MD	**Subtotal: Urb/Suburb**				13,402	13,108	12,813	12,516	12,221	11,926	11,631	11,334	11,040
DC	**Potomac**	**ANATF_MD**	**Total**				**15,763**	**15,469**	**15,174**	**14,877**	**14,583**	**14,287**	**13,992**	**13,695**	**13,402**
DC	Potomac	POTTF_DC	Wastewater: POTW	Ind. WLA	DC0021199		2,418,240	2,418,240	2,418,240	1,960,149	1,960,149	2,030,606	2,030,606	2,030,606	2,063,900
DC	Potomac	POTTF_DC	CSO/ Stormwater	Ind. WLA	DC0021199	12,118	19,610	19,610	19,610	19,610	19,610	19,610	19,610	19,610	2,586

St.	Maj. Basin	Impaired Segment Drainage	Source Sector	Type	NPDES Permit	2010 Ac.	2009 Load [1]	2011	2013	2015	2017 Interim Target	2019	2021	2023	2025 Final Target/ TMDL
DC	Potomac	POTTF_DC	**Total Sig Municipal**				2,437,850	2,437,850	2,437,850	1,979,759	1,979,759	2,050,216	2,050,216	2,050,216	2,066,486
DC	Potomac	POTTF_DC	Wastewater: Non-sig Indus	Agg. WLA	DC0000337 DC0000361		17,694	17,694	17,694	17,694	17,694	17,694	17,694	17,694	17,694
DC	Potomac	POTTF_DC	**Subtotal: Wastewater**				2,455,544	2,455,544	2,455,544	1,997,453	1,997,453	2,067,910	2,067,910	2,067,910	2,084,180
DC	Potomac	POTTF_DC	Urb/Suburb Runoff: MS4	Ind. WLA	DC0000221	8,005	42,011	41,688	41,365	41,042	40,719	40,396	40,073	39,750	39,427
DC	Potomac	POTTF_DC	Urb/Suburb Runoff: Non-MS4	LA		4,747	24,912	24,318	23,723	23,129	22,534	21,940	21,345	20,751	20,156
DC	Potomac	POTTF_DC	**Subtotal: Urb/Suburb**				66,923	66,006	65,088	64,171	63,253	62,336	61,418	60,501	59,583
DC	**Potomac**	**POTTF_DC**	**Total**				**2,522,467**	**2,521,550**	**2,519,715**	**2,061,624**	**2,060,706**	**2,130,246**	**2,129,328**	**2,128,411**	**2,143,763**
DC	Potomac	POTTC_MD	Wastewater: POTW	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	POTTC_MD	CSO/ Stormwater	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	POTTC_MD	**Total Sig Municipal**				0	0	0	0	0	0	0	0	0
DC	Potomac	POTTC_MD	Wastewater: Non-sig Indus	Agg. WLA	DC0000019		182,085	950	950	950	950	950	950	950	950
DC	Potomac	POTTC_MD	**Subtotal: Wastewater**				182,085	950	950	950	950	950	950	950	950
DC	Potomac	POTTC_MD	Urb/Suburb Runoff: MS4	Ind. WLA	DC0000221	1,183	18,288	17,880	17,471	17,063	16,654	16,246	15,837	15,429	15,019
DC	Potomac	POTTC_MD	Urb/Suburb Runoff: Non-MS4	LA		114	1,766	1,856	1,945	2,035	2,124	2,214	2,303	2,393	2,481
DC	Potomac	POTTC_MD	**Subtotal: Urb/Suburb**				20,055	19,736	19,416	19,098	18,778	18,460	18,140	17,822	17,500
DC	**Potomac**	**POTTC_MD**	**Total**				**202,140**	**20,686**	**20,366**	**20,045**	**19,727**	**19,410**	**19,090**	**18,772**	**18,450**
DC	Potomac		**District Reserve**												**87,498**
DC	Potomac		**Total**				**2,872,861**	**2,689,082**	**2,686,439**	**2,225,704**	**2,223,060**	**2,224,595**	**2,221,951**	**2,219,307**	**2,320,432**

[1] CBWSM Phase 5.3 erroneously placed CSS acres/load in ANATF_MD that are actually located in ANATF_DC

Table B2: Total Phosphorus Allocations and 2-Year Milestones.

St.	Maj. Basin	Impaired Segment Drainage	Source Sector	Type	NPDES Permit	2010 Ac.	2009 Load [1]	2011	2013	2015	2017 Interim Target	2019	2021	2023	2025 Final Target/ TMDL
DC	Potomac	ANATF_DC	Wastewater: POTW	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	ANATF_DC	CSO/ Stormwater	Ind. WLA	DC0021199	278	14,415	14,415	14,415	14,415	14,415	260	260	260	260
DC	Potomac	ANATF_DC	**Total Sig Municipal**				14,415	14,415	14,415	14,415	14,415	260	260	260	260
DC	Potomac	ANATF_DC	Wastewater: Non-sig Indus	Agg. WLA	DC0000094, DC0000035 DC0000141 DC000345		595	595	595	595	595	595	595	595	595
DC	Potomac	ANATF_DC	**Subtotal: Wastewater**				15,010	15,010	15,010	15,010	15,010	855	855	855	855
DC	Potomac	ANATF_DC	Urb/Suburb Runoff: MS4	Ind. WLA	DC0000221	8,188	8,958	8,651	8,343	8,036	7,728	7,421	7,113	6,806	6,498
DC	Potomac	ANATF_DC	Urb/Suburb Runoff: Non-MS4	LA		2,531	2,770	2,606	2,443	2,279	2,115	1,951	1,788	1,624	1,459
DC	Potomac	ANATF_DC	**Subtotal: Urb/Suburb**				11,728	11,257	10,786	10,315	9,843	9,372	8,901	8,430	7,957
DC	**Potomac**	**ANATF_DC**	**Total**				**26,738**	**26,267**	**25,796**	**25,325**	**24,852**	**10,227**	**9,756**	**9,285**	**8,812**
DC	Potomac	ANATF_MD	Wastewater: POTW	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	ANATF_MD	CSO/ Stormwater	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	ANATF_MD	**Total Sig Municipal**				0	0	0	0	0	0	0	0	0
DC	Potomac	ANATF_MD	Wastewater: Non-sig Indus	Agg. WLA	DC0000175		66	66	66	66	66	66	66	66	66
DC	Potomac	ANATF_MD	**Subtotal: Wastewater**				66	66	66	66	66	66	66	66	66
DC	Potomac	ANATF_MD	Urb/Suburb Runoff: MS4	Ind. WLA	DC0000221	1,772	2,549	2,411	2,273	2,134	1,996	1,858	1,720	1,581	1,444
DC	Potomac	ANATF_MD	Urb/Suburb Runoff: Non-MS4	LA		110	159	144	130	115	100	85	71	56	41
DC	Potomac	ANATF_MD	**Subtotal: Urb/Suburb**				2,707	2,555	2,403	2,249	2,096	1,943	1,791	1,637	1,485
DC	**Potomac**	**ANATF_MD**	**Total**				**2,773**	**2,621**	**2,469**	**2,315**	**2,162**	**2,009**	**1,857**	**1,703**	**1,551**
DC	Potomac	POTTF_DC	Wastewater: POTW	Ind. WLA	DC0021199		85,333	85,333	85,333	92,627	92,627	92,672	92,672	92,672	92,693
DC	Potomac	POTTF_DC	CSO/ Stormwater	Ind. WLA	DC0021199	12,118	4,183	4,183	4,183	4,183	4,183	4,183	4,183	4,183	550

St.	Maj. Basin	Impaired Segment Drainage	Source Sector	Type	NPDES Permit	2010 Ac.	2009 Load [1]	2011	2013	2015	2017 Interim Target	2019	2021	2023	2025 Final Target/ TMDL
DC	Potomac	POTTF_DC	**Total Sig Municipal**				89,516	89,516	89,516	96,810	96,810	96,855	96,855	96,855	93,243
DC	Potomac	POTTF_DC	Wastewater: Non-sig Indus	Agg. WLA	DC0000337 DC0000361		507	507	507	507	507	507	507	507	507
DC	Potomac	POTTF_DC	**Subtotal: Wastewater**				90,023	90,023	90,023	97,317	97,317	97,362	97,362	97,362	93,750
DC	Potomac	POTTF_DC	Urb/Suburb Runoff: MS4	Ind. WLA	DC0000221	8,005	3,736	3,641	3,546	3,450	3,355	3,260	3,165	3,069	2,975
DC	Potomac	POTTF_DC	Urb/Suburb Runoff: Non-MS4	LA		4,747	2,215	2,109	2,003	1,896	1,790	1,684	1,578	1,471	1,365
DC	Potomac	POTTF_DC	**Subtotal: Urb/Suburb**				5,951	5,750	5,549	5,346	5,146	4,944	4,743	4,540	4,339
DC	**Potomac**	**POTTF_DC**	**Total**					**95,373**	**95,172**	**102,263**	**102,463**	**101,906**	**101,705**	**101,502**	**98,090**
DC	Potomac	POTTC_MD	Wastewater: POTW	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	POTTC_MD	CSO/ Stormwater	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	POTTC_MD	**Total Sig Municipal**				0	0	0	0	0	0	0	0	0
DC	Potomac	POTTC_MD	Wastewater: Non-sig Indus	Agg. WLA	DC0000019		20,617	107	107	107	107	107	107	107	107
DC	Potomac	POTTC_MD	**Subtotal: Wastewater**				20,617	107	107	107	107	107	107	107	107
DC	Potomac	POTTC_MD	Urb/Suburb Runoff: MS4	Ind. WLA	DC0000221	1,183	753	726	699	672	645	618	591	564	536
DC	Potomac	POTTC_MD	Urb/Suburb Runoff: Non-MS4	LA		114	73	69	65	61	57	53	49	45	42
DC	Potomac	POTTC_MD	**Subtotal: Urb/Suburb**				826	795	764	733	702	671	640	609	578
DC	**Potomac**	**POTTC_MD**	**Total**				**21,443**	**902**	**871**	**840**	**809**	**778**	**747**	**716**	**685**
DC	Potomac		**District Reserve**												**12,076**
DC	Potomac		**Total**				**146,930**	**125,563**	**124,706**	**131,143**	**130,286**	**115,321**	**114,464**	**113,607**	**121,213**

[1] CBWSM Phase 5.3 erroneously placed CSS acres/load in ANATF_MD that are actually located in ANATF_DC

Table B2: Total Suspended Sediments Allocations and 2-Year Milestones.

St.	Maj. Basin	Impaired Segment Drainage	Source Sector	Type	NPDES Permit	2010 Ac.	2009 Load [1]	2011	2013	2015	2017 Interim Target	2019	2021	2023	2025 Final Target/ TMDL
DC	Potomac	ANATF_DC	Wastewater: POTW	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	ANATF_DC	CSO/ Stormwater	Ind. WLA	DC0021199	278	1,560,755	1,560,755	1,560,755	1,560,755	1,560,755	28,169	28,169	28,169	28,169
DC	Potomac	ANATF_DC	**Total Sig Municipal**				1,560,755	1,560,755	1,560,755	1,560,755	1,560,755	28,169	28,169	28,169	28,169
DC	Potomac	ANATF_DC	Wastewater: Non-sig Indus	Agg. WLA	DC0000094, DC0000035 DC0000141 DC000345		34,190	34,190	34,190	34,190	34,190	34,190	34,190	34,190	34,190
DC	Potomac	ANATF_DC	**Subtotal: Wastewater**				1,594,945	1,594,945	1,594,945	1,594,945	1,594,945	62,359	62,359	62,359	62,359
DC	Potomac	ANATF_DC	Urb/Suburb Runoff: MS4	Ind. WLA	DC0000221	8,188	2,429,170	2,335,833	2,242,495	2,149,158	2,055,820	1,962,483	1,869,145	1,775,808	1,682,470
DC	Potomac	ANATF_DC	Urb/Suburb Runoff: Non-MS4	LA		2,531	751,133	700,809	650,486	600,162	549,838	499,514	449,191	398,867	348,544
DC	Potomac	ANATF_DC	**Subtotal: Urb/Suburb**				3,180,303	3,036,642	2,892,981	2,749,319	2,605,658	2,461,997	2,318,336	2,174,674	2,031,014
DC	Potomac	**ANATF_DC**	**Total**				**4,775,248**	**4,631,587**	**4,487,926**	**4,344,264**	**4,200,604**	**2,524,356**	**2,380,695**	**2,237,033**	**2,093,372**
DC	Potomac	ANATF_MD	Wastewater: POTW	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	ANATF_MD	CSO/ Stormwater	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	ANATF_MD	**Total Sig Municipal**				0	0	0	0	0	0	0	0	0
DC	Potomac	ANATF_MD	Wastewater: Non-sig Indus	Agg. WLA	DC0000175		12,100	12,100	12,100	12,100	12,100	12,100	12,100	12,100	12,100
DC	Potomac	ANATF_MD	**Subtotal: Wastewater**				12,100	12,100	12,100	12,100	12,100	12,100	12,100	12,100	12,100
DC	Potomac	ANATF_MD	Urb/Suburb Runoff: MS4	Ind. WLA	DC0000221	1,772	572,918	540,606	508,294	475,982	443,670	411,358	379,046	346,734	314,421
DC	Potomac	ANATF_MD	Urb/Suburb Runoff: Non-MS4	LA		110	35,675	32,473	29,272	26,070	22,868	19,666	16,465	13,263	10,062
DC	Potomac	ANATF_MD	**Subtotal: Urb/Suburb**				608,593	573,079	537,566	502,052	466,538	431,024	395,511	359,997	324,483
DC	Potomac	**ANATF_MD**	**Total**				**620,693**	**585,179**	**549,666**	**514,152**	**478,638**	**443,124**	**407,611**	**372,097**	**336,583**
DC	Potomac	POTTF_DC	Wastewater: POTW	Ind. WLA	DC0021199		2,236,612	2,236,612	2,236,612	2,417,926	2,417,926	2,508,960	2,508,960	2,508,960	2,551,977
DC	Potomac	POTTF_DC	CSO/ Stormwater	Ind. WLA	DC0021199	12,118	452,502	452,502	452,502	452,502	452,502	452,502	452,502	452,502	59,555

St.	Maj. Basin	Impaired Segment Drainage	Source Sector	Type	NPDES Permit	2010 Ac.	2009 Load [1]	2011	2013	2015	2017 Interim Target	2019	2021	2023	2025 Final Target/ TMDL
DC	Potomac	POTTF_DC	**Total Sig Municipal**				2,689,114	2,689,114	2,689,114	2,870,428	2,870,428	2,961,462	2,961,462	2,961,462	2,611,532
DC	Potomac	POTTF_DC	Wastewater: Non-sig Indus	Agg. WLA	DC0000337 DC0000361		111,096	111,096	111,096	111,096	111,096	111,096	111,096	111,096	111,096
DC	Potomac	POTTF_DC	**Subtotal: Wastewater**				2,800,210	2,800,210	2,800,210	2,981,524	2,981,524	3,072,558	3,072,558	3,072,558	2,722,628
DC	Potomac	POTTF_DC	Urb/Suburb Runoff: MS4	Ind. WLA	DC0000221	8,005	4,904,197	4,771,653	4,639,110	4,506,566	4,374,022	4,241,478	4,108,935	3,976,391	3,843,847
DC	Potomac	POTTF_DC	Urb/Suburb Runoff: Non-MS4	LA		4,747	2,908,086	2,742,332	2,576,577	2,410,823	2,245,068	2,079,314	1,913,599	1,747,805	1,582,051
DC	Potomac	POTTF_DC	**Subtotal: Urb/Suburb**				7,812,283	7,513,985	7,215,687	6,917,388	6,619,090	6,320,792	6,022,494	5,724,195	5,425,897
DC	Potomac	**POTTF_DC**	**Total**				**10,612,493**	**10,314,195**	**10,015,897**	**9,898,912**	**9,600,614**	**9,393,350**	**9,095,052**	**8,796,753**	**8,148,526**
DC	Potomac	POTTC_MD	Wastewater: POTW	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	POTTC_MD	CSO/ Stormwater	Ind. WLA	DC0021199		0	0	0	0	0	0	0	0	0
DC	Potomac	POTTC_MD	**Total Sig Municipal**				0	0	0	0	0	0	0	0	0
DC	Potomac	POTTC_MD	Wastewater: Non-sig Indus	Agg. WLA	DC0000019		17,427,496	90,105	90,105	90,105	90,105	90,105	90,105	90,105	90,105
DC	Potomac	POTTC_MD	**Subtotal: Wastewater**				17,427,496	90,105	90,105	90,105	90,105	90,105	90,105	90,105	90,105
DC	Potomac	POTTC_MD	Urb/Suburb Runoff: MS4	Ind. WLA	DC0000221	1,183	560,577	535,975	511,374	486,772	462,170	437,568	412,967	388,365	363,762
DC	Potomac	POTTC_MD	Urb/Suburb Runoff: Non-MS4	LA		114	54,146	51,990	49,835	47,679	45,523	43,367	41,212	39,056	36,900
DC	Potomac	POTTC_MD	**Subtotal: Urb/Suburb**				614,723	587,966	561,208	534,451	507,693	480,936	454,178	427,421	400,663
DC	Potomac	**POTTC_MD**	**Total**				**18,042,219**	**678,071**	**651,313**	**624,556**	**597,798**	**571,041**	**544,283**	**517,526**	**490,767**
DC	Potomac		**District Reserve**												**88,871**
DC	Potomac		**Total**				**34,050,654**	**16,209,032**	**15,704,801**	**15,381,884**	**14,877,654**	**12,931,870**	**12,427,639**	**11,923,409**	**11,158,120**

[1] CBWSM Phase 5.3 erroneously placed CSS acres/load in ANATF_MD that are actually located in ANATF_DC